DOCUMENT RESUME

ED 329 283 IR 053 478

TITLE IFLA General Conference, 1990. Division of Special Libraries: Section of Administrative Libraries; Section of Social Science Libraries; Section of Science and Technology Libraries; Section of Biological and Medical Sciences Libraries; Section of Art Libraries. Booklet 2.

INSTITUTION International Federation of Library Associations, The Hague (Netherlands).

PUB DATE Aug 90

NOTE 199p.; Papers presented at the International Federation of Library Associations (IFLA) General Conference (56th, Stockholm, Sweden, August 18-24, 1990). Booklet 2 contains 12 papers. In addition, the document contains an English translation of the French paper, and 11 other presentations.

PUB TYPE Speeches/Conference Papers (150)

EDRS PRICE MF01/PC08 Plus Postage.

DESCRIPTORS Federal Government; Fine Arts; Foreign Countries; *Government Libraries; Hypermedia; Information Management; Information Storage; International Organizations; *Library Administration; Library Personnel; Library Role; *Medical Libraries; *National Libraries; Online Catalogs; Preservation; *Research Libraries; *Special Libraries

IDENTIFIERS Building Security; Document Delivery Systems; Information Skills

ABSTRACT

The 23 papers in this collection were presented at 5 sections of the Division of Special Libraries: (1) "Principles of Government Librarianship" (Hans H. van der Neut); (2) "Strategic Planning as an Instrument of Improving Library Quality" (Maurice B. Line); (3) "Library Staff Development Consultancy: A Means to Achieve a Better Library?" (Christopher J. Hunt); (4) "Why User Education and How Can Information Technology Help?" (Nancy Fjallbrant); (5) "La Maitrise Strategique de l'Information Composante Essentielle de la Formation des Ingenieurs" The Strategic Management of Information: An Essential Element in the Training of Engineers (Jean Michel); (6) "Information Skills across the Curriculum" (Ann Irving); (7) "Development of Hospital Libraries in Sweden" (Lena Sewall); (8) "Automation at Landspitalinn Medical Library" (Solveig Thorsteinsdottir); (9) "Success Factors in Transforming a Traditional Medical Library into an Information Center for the Future" (Elisabeth Buntz); (10) "The Iceberg of Crumbling Books: Conservation and Related Activities in Norway" (Rolf Dahlo); (11) "International Standardization of Requirements to Permanent Paper: A Status Report, April 1990" (Ivar A. L. Hoel); (12) "The Restoration of Posters from 1940-1945 in the Royal Library" (Wijnand Goossens and Jacobus van de Watering); (13) "Government Libraries in Sweden--A Survey of Information Services" (Eva B. Bjorck); (14) "On the Problem of Library Collections Requiring Constant Amendment and Updating, as Exemplified by Patent Specifications..." (Gerhard Kruse); (15) "The Information and Library Environment and the Productivity of Research" (Michael Koenig); (16) "The Online Document Ordering Network for Libraries in the Federal Republic of Germany" (Ekkehart Seusing); (17) "Document Delivery in the Pacific" (Esther W. Williams); (18) "An Agreement between the Libraries of European Business Schools for the Exchange of Documents" (Louis d'Arras d'Haudrecy); (19) "ABI/Inform Full Text" (Susan Orchard); (20) "Digital Mapping on CD-ROM" (Peter G. Ochman); (21) "Map Catalogue and Graphic Interface from the PC Version of the Swedish National Atlas" (Goran Baarnhielm and Wolter Arnberg); (22) "Documentation and Interactive Cartographic Systems" (Hans Van De Waal); and (23) "HyperCard: Information Storage and Retrieval in a Map Library" (C. K. Chu). (MAB)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

56th IFLA
GENERAL CONFERENCE
STOCKHOLM, SWEDEN
18–24 AUGUST 1990

ED329283

BOOKLET 2

DIVISION OF SPECIAL LIBRARIES

SECTION OF ADMINISTRATIVE LIBRARIES

Session 119 Tuesday 21 August 12:00–14:30

Principles of Government Librarianship (83-ADM-1-E) — Hans H. van der Neut, Library and Documentation Department, Ministry of Education and Science, Zoetermeer, Netherlands

SECTION OF SOCIAL SCIENCE LIBRARIES

Session 91 Monday 20 August 10:30–13:00

Strategic Planning as an Instrument of improving Library Quality (26-SOC-2-E) — Maurice B. Line, Harrogate, UK

Library Staff Development Consultancy: a Means to achieve a better Library? (25-SOC-1-E) — Christopher J. Hunt, British Library of Political and Economic Science, London School of Economics, London, UK

SECTION OF SCIENCE AND TECHNOLOGY LIBRARIES

Session 112 Tuesday 21 August 12:00–14:30

Why User Education and how can Information Technology help? (58-SCIE-1-E) — Nancy Fjällbrant, Chalmers University of Technology Library, Göteborg, Sweden

La maîtrise stratégique de l'information: composante essentielle de la formation des ingénieurs (59-SCIE-2-F) — Jean Michel, Centre Pédagogique de Documentation et de Communication, Ecole Nationale des Ponts et Chaussées, Paris, France

Information Skills across the Curriculum (60-SCIE-3-E) — Ann Irving, Department of Library and Information Studies, Loughborough Univeristy, Loughborough, UK

IR053478

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

A.L.Van Wesemael

TO THE EDUCATIONAL RESOURCES

BEST COPY AVAILABLE

SECTION OF BIOLOGICAL AND MEDICAL SCIENCES LIBRARIES

Session 97 Monday 20 August 10:30–13:00

Development of Hospital Libraries in Sweden (78-BIOL-1-E)	Lena Sewall, Hospital Library, Karlstad Central Hospital, Karlstad, Sweden
Automation at Landspitalinn Medical Library (79-BIOL-2-E)	Solveig Thorsteinsdottír, Landspitalinn Medical Library, Reykjavik, Iceland
Success Factors in transforming a traditional medical Library into an Information Center for the future (80-BIOL-3-E)	Elisabeth Buntz, Rikshospitalet Medical Library and Information Centre, Oslo, Norway

SECTION OF ART LIBRARIES

Session 128 Tuesday 21 August 15:00–17:30

The Iceberg of crumbling Books: Conservation and related Activities in Norway (31-ART-1-E)	Rolf Dahlø, National Office for Research and Special libraries, Oslo, Norway
International Standardization of Requirements to permanent Paper: a Status Report, April 1990 (32-ART-2-E)	Ivar A.L. Hoel, Royal School of Librarianship, Copenhagen, Denmark
Restoration of Posters from 1940–1945 in the Royal Library (33-ART-3-E)	Wijnand Goossens and Jacobus van de Watering, Royal Library, The Hague, Netherlands

INFORMATION CENTER (ERIC)"

Principles of Government Librarianship

Hans H. van der Neut
Head, Library and Documentation Department,Ministry of Education and Science, Zoetermeer, the Netherlands

Abstract
Government libraries are special libraries in a political setting, but they are also just corporate libraries. The paper focuses on ministry libraries as an example. The reasons for the existence of a ministry library are discussed, and also the different tasks and functions, also outside the ministry. Some problems are discussed, e.g.: grey literature, censorship, split-ups, the use of computers. Recommendations for a strong position of the library are given.

Introduction
Government libraries are, on the one hand, very special libraries because they work in a political setting. Their main principal is a minister or a city government etc., but he/she or it is always in the uncertain circumstances which are inherent in politics. On the other hand I dare to say, due to my experience in three ministry libraries, that most points in this paper are also relevant for other corporate libraries, even in commercial business firms.

For more literature on corporate librarianship I draw your attention to an article in the journal "Special Libraries" by Herbert S. White (1).

This paper focuses on ministry libraries as an example.

Ministry libraries must be aware that, for the ministry, their budget is part of the overhead costs: the effect of their work is only indirect. So sometimes they must even defend their mere existence. There are many good reasons for that existence, to be found mainly in the skills of the library's personnel.

Tasks and functions
There are also many actual tasks for a ministry library, but beware of exaggeration. The library has always shortage of staff and money, so it cannot pretend to be able to give all the service which could be useful. And besides that: many library users like to look and search for themselves.

Generally the main task of a ministry library is to support the policy makers in the ministry. A former Dutch minister of Environment introduced the model of the "policy life cycle" (2) with four phases: recognition, policy formulation, solution and control. The ministry library has especially a task in the first two phases.

Part of the business can also be: a service to people and organisations outside the ministry. The reasons for this can be manifold:

* an instruction to do this because of:
  - the relations with the "field";
  - an information service for the public;
  - the ministry's public relations.
* but it may also be in the interest of the library itself, regarding:
  - an allocation of tasks;

- the principle of reciprocity;
- a chance for earning money.

In the Netherlands we distinct four functions of a ministry library: the internal "corporate function" and three external ones: the "field function", the "complementary function" and the "national function". (3)

Some problems

* grey literature: difficult material, but it gives a chance to present the library with a good profile.
* the dividing line between public and confidential material: even unpublished documents can be public.
* censorship and the value of illegal publications: value for the library and for the minister.
* the changeableness of the political management, and the value of continuity.
* the splitting up of a ministry: should the library collection be split up, too?
* the closing down and the joining together of ministries: many practical problems.
* the use of computers and CD-ROMs.

Recommendations for a strong position

Arrange for the membership of some networks of people and institutions:
- with other government libraries in the country;
- in the "field" of the ministry;
- with universities and research institutions;
- international.

Take good care of regular contact with the policy departments and the central management department (if there is any) of the ministry. This can give good feedback, in different ways.

Some of the library's patrons are more important for the library than other ones (e.g. because of their position and influence). It can be a good idea to provide them with a special service or extra material, but in any case this must contain really relevant information.

Take good care to have some visible and tangible products: not only the service of an information desk, but also lists or reviews on actual topics.

Try to integrate the library's information with related types of information: documentation, statistical data, legal information, etc.

Have a good relationship with the department which is responsible for the public relations, the spokesmanship and the ministry's publications. Partly they work in the same field as the library does and their attitude to actuality and publicity can be a great help to the library.

And above all: deliver the best service you can, each day again.

The future

What the future has in reserve for any library, depends very much on what is possible in its organisation and its country. That is a matter of technical, financial and managerial possibilities. Anyhow, the information explosion will not come to an end very soon, and for that reason libraries and documentation centres will keep their function in society. The more information there is, the more professional help is needed with selection and retrieval. Indeed, it is still true what Naisbitt said, years ago (4): "We are drowning in information, but starving for knowledge."

References

1. Herbert S. White. The "Quiet Revolution": A Profession at the Crossroads. *Special Libraries* 80 (1989) 1, p. 24–30.
2. *International Environmental Policy: Summary of introductory notes by H.E. dr. Pieter Winsemius, Netherlands Minister of Housing, Physical Planning and Environment at the symposium "Regulation of Chemicals in the Global Environment", organized by the institute for European Environmental Policy, Brussels, 30 January 1986.* Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer. 's-Gravenhage 1986. (Press Release)
3. Adriaan G.A. Staats. Libraries. Documentation and Information Service Offices in Public Administration with Special Reference to the Netherlands: Present and Future Outlook. *Inspel* 22 (1988) 3, p. 212–218.
4. John Naisbitt. *Megatrends, Ten New Directions Transforming Our Lives.* Warner Books. New York 1982.

Strategic Planning as an Instrument of improving Library Quality

Maurice B. Line, Harrogate, UK

Abstract

Strategic planning is becoming more important with increasing financial and other pressures on libraries. By constructing a plan (which will normally cover five years) a library can take some control of its future. No generally applicable model can be laid down, but some features are common to all or most plans. Staff at all levels should be involved in the preparation of a plan. The effect on them of seeing the library as a whole and helping to shape its future can be considerable. Strategic planning can be a catalytic and creative force.

Purpose

Strategic planning has become quite common in libraries in several countries in recent years, following its use in other organizations in both the public and private sectors. It might be regarded as simply another fashion in management, soon to go the way of other fashions: or as just a new name for a process that libraries and other bodies do anyway. Certainly there are corporate plans, business plans, development plans, forward plans, five-year plans, and various other names that may express more or less the same thing – or they may not.

A strategic plan implies a systematic process based on a real *strategy* for the future. It establishes coherent aims realizable within a given period of time, usually five years in public sector bodies, in the context of a set of clear objectives. It thus sets out both a destination and a map that the organization should follow in reaching it. Why is this process desirable now if libraries have done without it for generations?

In the past libraries were able to live from year to year, usually with annual increases in their budgets, without having to look at priorities too closely or even having to justify their budgets in any but general terms. Forward planning, where it existed, consisted largely of requests for more and more money to do more and more things: in effect, a plan was a wish list. This is no longer possible for the majority of libraries, which have to contend with smaller funds in real terms, with a greater range of competing demands and opportunities, and above all with ever increasing pressure from their parent bodies for accountability, value for money and precise justification of all resources. Libraries have to make sure that they know where they are going, that they are making optimal use of their present resources of stock, staff, buildings and equipment, and that they have a clear sense of priorities, both for what they would cut from their present activities if they had to and for what they propose to do in the future.

Library plans need of course to relate to any plans that their parent bodies may have constructed or be in the process of constructing. It is tempting to wait until such plans are ready before preparing a library plan, but this is usually a mistake. Either the organization's plan does not mention the library, in which case time has been lost waiting; or it mentions the library in ways that show misunderstanding, in which case it may be difficult to change it; or, worst of all, it includes a plan for the library which shows good understanding but which sets out a direction and path other than that which the library wants to follow. It is far better in my view for the library to prepare its own plan, in the light of known institutional object-

ives, either parallel with or in advance of the institutional plan; either way, it can exercise a strong influence on the institutional plan. Most important of all, in constructing a strategic plan the library can take some control over its own future; it cannot blame the parent body for pushing it in wrong directions if it has not established for itself the right ones.

Audience

The first and obvious audience for the strategic plan is the parent body, for the reasons stated; the library needs to convince it that it has a sense of direction and is well equipped in management terms to follow it. However, an equally important audience is the library's own staff, who can benefit greatly by seeing the library's proposed future set out; the involvment of staff in the preparation of the plan and the follow up to it is dealt with later. A further audience is the wider public; this is particularly important in the case of a public library, serving as it does a local community, or a national library, which serves the whole nation, including other libraries.

Nature

As stated above, the strategic plan will generally cover five years. A commercial company will not usually wish, or be able, to look that far ahead, because conditions, markets and competitors can change quite rapidly. In the public sector there is less change of this kind, though change has become much more rapid in the last decade or two, and five years is by no means too long a period. Indeed, it is often desirable in the case of national and major academic libraries to start by attempting a longer perspective, say over ten years. The plan can then be formed in the consciousness of this longer term vision.

As also stated, the plan must not be a wish list. Its precise form will vary with circumstances, and a generally applicable model cannot be laid down, but some features will be common to all or most plans.

After a foreword explaining the purpose and intended audience of the plan, it will typically begin with a general statement of the library's aims and objectives, commonly called a mission statement. It may then have a section on the background – the institutional bakground, and external factors such as the growth of published material and developments in electronic publishing.

The plan proper will be divided into chapters dealing with different parts or activities of the library. How it is structured depends on how the library sees itself or wishes to be seen. A library with an important archival function will place emphasis on collections, one with a more prominent service function, such as a public library, will emphasize services. The obvious division for national and academic libraries is into collections, services, equipment, staff and so on; but there are a number of ways in which each chapter can be arranged, and the library may decide to organize the whole plan in a more adventurous way, for example by type of user or service, subordinating collections in either case. A possible outline for an academic library is given as an appendix.

Each chapter should include a brief statement of the present position, its strengths and weaknesses; a list of actions needed to deal with the weaknesses, with an indication of priorities and also an estimate of costs and time-scale required to meet them; and a statement of proposed new services and activities, again with costs and timing.

As well as chapters on various parts of the library's service, the plan will normally have chapters on aspects that cut across the operations but that are worthy of special attention, such as automation and equipment.

It is important that the plan should be as specific as possible about the objectives and how they are to be reached. Since it is assumed that resources are limited or have to be argued

for in quantifiable terms, activities should, as noted above, have costs and also performance indicators attached to them. For exemple, if a larger acquisition fund, or a different disposition thereof, is proposed, the cost-effectiveness of the present and proposed allocation should be established in general terms; and if it is intended to extend services or create new ones the plan should state how their success is to be assessed.

Unless the library is unusually well managed, it will not be able within the time of the plan's preparation to be very precise about costs and performance indicators; all that may be possible is to set them down in general terms, and then to undertake to go into more detail later. Indeed, it might well be one of the planned actions to establish costs and performance measures in the first year or so of the period.

Each chapter should start with its own statement of objectives, and then state how they are to be met over the five years. This will mean that a programme has to be established, not year by year but with some indication of time-scale. For example, it may be stated that one or more uncatalogued special collections will be completed within the first two years, and some remaining ones in the rest of the period. The programme will necessarily become vaguer longer into the period.

The need for clear priorities has already been mentioned. It cannot be stressed too strongly that no library, or part of a library, can do all that it would like to, and choices have to be made.

Every library, unless it is a very unusual one, has messes in varying numbers and of varying scale and seriousness. The plan offers an opportunity to look at these in a total context. It may be concluded that a particular mess would take so long to clear up, and that its importance is now so little, that it is best abandoned altogether, even if it means (for example) the disposal of a special collection. There is a danger that the whole plan will consist of a programme to deal with messes; the impression this makes on the minds of readers can only be negative (the institution must wonder why the library is in such a state), and it is important that mess management and disposal are balanced by positive proposals to improve services. The plan must be forwardlooking, not backward-looking.

Indeed, the *tone* of the plan is almost as important as its contents. The library must not give the impression that it exists only to suit itself or its staff. "Customer concern" is currently a popular slogan, but it is not a fad; no library except one that is primarily a museum is ultimately of use unless it serves people, and that must be one of the messages that the plan conveys.

The style of the plan is also important. Wording such as "the library wishes to..." or "the library hopes to..." is not appropriate. The plan must be a statement of real intentions. "The library will..." is best if it is certain that the action can be carried out; a less positive wording, which may be necessary in some cases, is "the library proposes to...". There is no reason why, when the library wishes to explore a new service or the use of new methods for existing activities, the plan should not say "The library will examine such-and-such with a view to..." or "The market for so-and-so will be explored". The first strategic plan may contain quite a few such statements.

If a strategic plan is to make an impact, or even be read at all, it should be concise. A summary at the beginning is highly desirable, but it should not be used as an excuse for inordinate length of the main document. In a library of any size, 20 pages is probably the minimum possible, but anything over 40 pages is too long.

A strategic plan will normally be revised within the first three years; in effect, it will be a rolling plan. This is necessary because circumstances – not merely financial and institutional but technological – can change a lot in two or three years; they can make some aims more realizable, or more desirable, and some less so.

Process

How should a strategic plan be prepared? The problems and timescale should not be underestimated. The time required will vary according to the size of the library and to a lesser extent on the staff available; a sizable library will do well to produce a finished version within twelve months.

In practical terms, there are several ways in which a plan can be prepared. At one extreme, the librarian can do it all himself, taking advice as necessary from other members of staff. At the other, all members of staff can be involved in drafting. The best procedure is somewhere between these two extremes. There are, I believe, three basic requirements that need to be met: a single coordinator; a team to oversee the plan, to monitor progress and to decide priorities for particular aspects that cannot be decided by the section drafting; and the participation of as many staff as possible. The reason for the first is obvious; the person in question should be a good drafter (beacause various styles of presentation etc. will need to be homogenized), but need not be very senior. The reason for the team is also clear; the members should represent a spread of interests and views, and carry a fair degree of authority. They may be staff at the second or third level in the library. If the librarian is not included in the planning team he will probably wish to see the plan from time to time during drafting.

My third requirement, the involvement of as many staff as possible, needs more explanation. One major product of the strategic planning process is a consensus among staff as to the nature and objectives of the library. In fact, it is not merely a product, but a prerequisite for a successful plan; for unless the plan truly represents the views of staff it is unlikely to be achieved, since they will not be convinced by it and may even be offended and demotivated by the presumption that the boss knows best for them. The first part of the plan, the mission statement, must be an agreed statement. Chapters of the plan should be drafted by the departments of the library that are closest to them; department heads should not do all the drafting themselves but consult with their staff – *all* their staff – at the discussion as well as the drafting stage. One obvious problem with this approach, that the plan may be too down-to-earth and unimaginative, can be avoided if there is good and constant interaction between the planning team and the drafters.

In addition, a library may benefit from the assistance of a facilitator with experience in strategic planning. Few libraries can claim to have much experience themselves, and such a person can be helpful in providing perspective and seeing points that may otherwise be missed.

It will be understood why the preparation of a strategic plan takes so much time. There may be a temptation to cut corners and save time, particularly if the library is under pressure from the institution to produce a plan: but if this is done the results are likely to be so inferior, not only in the plan itself but in the effects on staff, that the temptation should be firmly resisted. The fact that in the next few years many libraries will be under pressure to produce a plan is a very good reason why they should start now, so that they are not forced into doing a hasty job later.

Follow-up

It is all too easy for a library, having gone through the quite exhausting process of producing a strategic plan, to sit back in relief and then discover in a year's time that few of the actions have actually been taken. It is essential to monitor progress. Monitoring would normally be the task of whatever internal management committee the library had; this would review progress every three months or so. However, a five-year plan cannot be precise about dates and persons responsible for actions, so that monitoring is very difficult.

It is therefore valuable – I would say essential – to follow up the strategic plan with annual

operational plans, specifying precise targets that will be met within the coming year, when they will be met and who is responsible for meeting them. These are much easier to monitor, and they also oblige all staff to take the task of implementation seriously. Targets must of course be set within the objectives established in the strategic plan, but they can and normally should be set by the staff concerned and reviewed by the library's management committee; perhaps surprisingly, staff do not usually set themselves low targets. They also welcome the prospect of annual appraisals based on targets rather than on the vague review of the year's performance that such appraisals are apt to consist of.

The first operational plans can be almost as hard to construct as the strategic plan, but subsequent plans are much easier. In the case of both strategic and operational plans, it is more an attitude of mind, a systematic way of looking at the library's operations, than particular skills that is important.

Effects

The purpose of a strategic plan was outlined at the beginning of this paper. Does it actually serve the purpose, and what other effects are there?

Strategic plans in libraries are too recent a development for much effect to be noticeable yet. At the least, a parent body can hardly ignore one; and almost certainly it will be impressed by its existence. At best, it will help to put the library on a much firmer footing with the institution. It is also difficult to say what would have happened if the library had not had a plan – whether the institution would have dealt much more hardly with the library, or whether it would have made no difference. This all assumes that the plan is a good one; a poor one will almost certainly be counter-productive. In any case, the library may be given no choice but to prepare a plan: in such a case the effects of not preparing one can be imagined.

The effects on staff may be more confidently stated. If the preparation of a plan is presented as an awesome and unwelcome task, staff will resent it and regard it as an intrusion on the ordinary work they have to do in the library: it will seem to them absurd to discuss future plans, including some for dealing with backlogs, if the time spent on drafting results in a growth in the backlogs in question. For this reason alone, it is vital that the reasons for the plan are fully discussed with staff at the outset, and their commitment obtained. This may not be easy.

In fact, if the preparation of a strategic plan is handled properly it can have a highly beneficial effect on staff. The drafting of an agreed mission statement alone makes them think about the library as a whole, and what it is really about; they probably all have their own half-formulated ideas, but it is a different matter to articulate and share them, and to reduce disagreements until a consensus is reached. Similarly, the process of drafting and agreeing sections of the plan can bring into the open misunderstandings and gradually create greater cohesion: teams begin to emerge in place of sets of individuals. At the same time staff have to familiarize themselves with more systematic and quantitative thinking, and to approach their work from a viewpoint of cost-effectiveness and with a view to establishing priorities. Thus the development of staff, both individually and corporately, can be greatly enhanced by the construction of a strategic plan.

In the process of preparing a plan staff have to think fundamentally about the library's nature and purpose and whether it is achieving its aims at present. It may well be found that the present structure and management style of the library need to be changed if it is to tackle the future with any confidence. It is not unusual for the library to undergo a fairly radical reappraisal during the process of constructing a strategic plan, and to finish up as a rather different sort of organization. Even if the impact of a strategic plan on the parent body may

be somewhat disappointing, the library and its staff are likely to end up in a better position. Strategic planning can be a catalytic and creative force.

References

Pfeiffer, J. William, & others. *Understanding applied strategic planning; a manager's guide.* San Diego, California: University Associates, Inc., 1985. *A good general guide to the concept and practice.*

Riggs, Donald E. *Strategic planning for library managers.* Phoenix, Arizona: Oryx Press, 1984.

Webster, Duane E. *Strategic planning in ARL libraries.* Washington, DC: Association of Research Libraries, 1984.

Vincent, Ida. "Strategic planning and libraries: does the model fit?" *Journal of Library Administration,* 9 (3), 1988, 35–47.

Pao, Miranda Lee & Warner, Robert M. "Strategic planning for the 1990s: a challenge for change." *Education for Information,* 7 (3), 1989, 262–271.

Baker, Shirley K. "Strategic planning for libraries in the electronic age." *IATUL Quarterly,* 3 (4), 1989, 200–206.

Examples of strategic plans are:

British Library. *Advancing with knowledge: strategic plan 1985–1990.* London: British Library, 1985.

British Library. *Gateway to knowledge: strategic plan 1989–1994.* London: British Library, 1989.

Massachusetts Institute of Technology. Libraries. *The MIT Libraries at the beginning of the 21st century – a strategic plan.* MIT Libraries, December 1988 (unpublished).

Library Staff Development Consultancy: a means to achieve a better library?

Christopher J. Hunt
Librarian, British Library of Political and Economic Science
London School of Economics, United Kingdom

Abstract
Library staff form the single most important component in achieving library service of quality. Good management practice is now recognised as being at least as crucial for the achievement of a successful library as professional skills. Even though staff development is a key responsibility of management, an outside consultant can provide stimulus at all levels in a library which management alone cannot do. A successful consultancy has potential of improving the whole "culture" of the library, and thus providing better services to users.

Library staff form the single most important component in achieving library service of quality. However considerable the collections and other resources, no library will function, even adequately, unless its staff are performing effectively. Professional skills and academic knowledge are important, but commitment, sense of purpose, and clarity of objectives are even more so. The achievement of organisation to bring these things about is a central function of management. Individuals are motivated by such material incentives as remuneration and the opportunity for self advancement. To perform well they also require the self esteem brought about by doing tasks that are clearly worthwhile in themselves, and demonstrably relate to the larger functions of the organisation. Effective communication is central. On the one hand, the policies and practices laid down by management should be within a context that is obviously rational to junior employees and, on the other, there should be routes for junior staff to pass information and suggestions upwards to influence overall policy.

The overriding need for good management practice is now recognised in every textbook for librarians, and in many countries training is available for all levels of staff, right up to directors of libraries, to improve skills and to ensure that library managers are kept in touch with the latest thinking and techniques. Understanding in theoretical terms how the library as an organisation should be functioning, however, is one thing; achievement within an individual library is quite another. The human predicament is that individual perfection is not obtainable this side of paradise. The same is true of an organisation. No library on earth can ever achieve a state where all staff are always productive, happy, carrying out tasks they enjoy, within an organisation whose aims they totally comprehend and support. There are, however, clearly better and worse situations. At worst a substantial number of library staff members can be deeply unhappy in their work, seeing their immediate tasks as boring and futile, the overall organisation as inefficient and without useful goals, their bosses uncaring. The very functions of management can be usurped by militant trade unionism, filling a vacuum. Such depths are uncommon in libraries, where a sense of mission and service is one of the reasons why people are attracted to make careers at all the levels of library work, but there are few institutions so continuously well run that such alienation does not occur in an endemic way amongst some groups of staff or within some departmental areas.

The pace of change in libraries is accelerating all the time. Not only new technology and new services but also changing expectations, particularly on the part of those who fund librar-

ies, produce new pressures. Greater accountability coupled with increasing expectations, at least in some places, that libraries should operate more in the market, raising significant amounts of funding by direct charges, make the task of management within a library more and more complex. Senior staff in libraries tend to be far more uncertain about their management skills than they are about their professional, and welcome help particularly in a form that does not undermine their authority or status. Library staff development programmes are the only way in which the challenges can be appropriately met, by staff whose natural careers will range through many substantial changes of circumstance.

Why a consultant?

Consultants are normally brought into an organisation to provide advice on specific problems about which there is either inadequate internal expertise or on which an outsidefs view is considered desirable. Automation is a common area where a consultant might be employed, to advise, for example, on the choice of an appropiate system for a library. Acqusitions policies are a field where a fresh eye can be particularly valuable. In the United Kingdom it has become increasingly common to employ consultants in a rather larger way. Management consultancy is one of the fastest growing business in the country. There is even a popular television programme where a former Chairman of Imperial Chemical Industries goes, on a weekly basis, to a different business, and analyses for the benefit of its directors, and the T.V. audience, how it might be put on a more profitable footing. In the public sector, government policies are to give preference to private sector involvement wherever possible, and it has become common practice for consultants to be involved at many levels of public administration. The Department of Social Security, for example, spent £19m. on consultants in 1987/88; £35m. in 1988/89. Where central issues of practice are involved, there is some disquiet that the use of consultants both weakens managers an absolves them of their key responsibility for the satisfactory conduct of their organisations' business. Is not employing a consultant on staff development within a library an acknowledgement of failure on the part of the library director? Advice on staff development from an outsider is not the same as advice on the choice of a copying machine. The consultant in the latter case is in the organisation for a limited period of time, considering a specific issue. His advice can be accepted, rejected or modified with little pain and no "loss of face". As will be shown shortly a consultancy on staff development should probably run for at least two years. By the very nature of the exercise, the entire organisation – objectives, culture, resources, personalities – is under scrutiny by an outsider, whose job it is to talk to staff members at every level. It would appear that a library director, voluntarily submitting his or her organisation to such scrutiny and his staff to such possible sedition, is either desperate or foolhardy. There are undoubtedly risks, certainly substantially more labour for the director and other senior staff, but the potential rewards are also considerable.

A consultancy in staff development is not an old-fashioned study of organisation and methods, with the outside expert laying down what should be done. No report, other than of the most formal kind, is necessary, and the consultant is responsible to the library director, not to an overriding authority. The absence of direct threat to any individual in the organisation is in fact an important component in the process, and a fundamental reason why a consultant can achieve more than the manager, even though staff development is an essential responibility of management. The object of the consultancy is to stimulate staff members at all levels in the library to examine what they are doing and why they are doing it, and from this analysis for staff themselves to design an evolutionary path towards improved ways of working, and thereby achieving service of higher quality for the users of the library. The resultats are potentially revolutionary in their effect on the organisation, but the changes

would be gradual, controlled by checks and balances of hierachy and existing order.

The outside consultant can stimulate such a process because he or she is outside the management hierarchy. He obviously must possess expertise and other qualities, but he also has the advantage over the manager that he can concentrate on staff and their organisation, unencunbered by direct concern over problem of funding and other resources. Such single-minded attention to one facet of management, albeit the most significant, can be highly irritating to the library director, necessarily involved with the total range of problems, but the discipline is an important part of the process; senior management are effectually taken to task every time adecision is made (or not made, when it should have been) on an arbitrary or disconnected basis.

The role of consultant in such a situation is clearly very demanding. Actual experience of management of a library is invaluable but so too is experience of generalized personnel work in any large organisation. A consultancy team of two people, between them having both sets of experience, would be easier to find than a single paragon. For the consultancy to work well a large number of qualities are needed. To quote the British Prime Minister about herself, "lots of stamina, and firm, fundamental convictions"are necessary, but combined with an ability to listen and draw out people who are not necessarily inclined to be communicative about their problems at work. Tact and confidentiality must be mixed with a need to demonstrate to individuals hard facts which they may not particurlarly wish to face. On the other hand, there should be no belief on the consultant's part that he is Superman, better able to manage the library in every way than those he is advising. He does not have to be. Stimulation can be given almost as much by irration with a consultant's failure to understand the true complexities of a situation as by a diagnosis that is immediately obvious as penetrating and fair. The ultimate decision regarding the conduct of business within the organisation remains for the organisaton itself to take. The consultants guides and persuades only. To quote Sir John Harvey-Jones, the ex-chairman of ICI, about his television programme, "The companies who called me in are the real heroes, for their openness. They have a bum like me come in and spend a couple of days and then they do things. Its fantastic".

The methodology of staff development consultancy

For all but the smallest libraries contemplating such an exercise it is crucial to realise that it cannot be rushed. Two years form perhaps the minimum period for a process that is intended to change radically the "culture" of the library, with visits from the consultant on a weekly basis in the early period of the consultancy. The consultant must become a familiar figure. A great deal of talking needs to be done. Exercises in analysis and planning take time. And, obviously, the "normal" work of the library must go on.

The consultant will require resources, most notably the time of a lot of people, particularly of those who are the busiest anyaway. He will require the near full-time assistance of a senior member of staff, initially to facilitate the exercise by arranging and following up meetings and generally co-ordinating what is going on, eventually perhaps becoming a staff development officer for the library. The process is not cheap, the consultancy fees probably not forming the largest segment of costs. However, in proportion to the medium or large size academic library's expenditure on staff, the outlay is not large, at least not when put in the context of the anticipated benefits in producitivity.

A useful focus for the project can be a strategic plan, either one already in existence or drawn up as part of the exercise. In the former case it should be stated that any pre-existing strategic plan is likely to be modified considerably in the process. The consultant does not write the plan; he encourages library staff to do it for themselves, providing advice and criticism while the process is going on. The strategic plan must start with the library's aims and

objectives which will require the governing bodýs formal endorsement. The overall plan will form the strategic framework for a series of operational plans, covering all areas of the library's acitivies and written primarily by the staff in these areas. The labour is considerable and the intellectual efffort is great, but those responsible for operational plans have no choice but to think through what they are doing in particular areas, why they are doing it, how effectively tasks are being carried out, and their relevance to the overall objectives of the library. True costs need to be worked out. Measures to judge future performance can be laid down. An essential constraint is insistence on the establishment of priorities within existing or limited resources. Where individuals and departments feel themselves to be overworked – as they all do – any solution to this overload must be found by changes in priority and method, rather than on the expectation that a benevolent magician will appear to wave a magic wand.

The analysis of decision making and communication within the library is a central feature of a consultant's role, where the outsider's perspective is likely to be very different from that of an insider, whether a manager or a subordinate. In almost any organisation it is in this area that most bitterness is expressed by members of the organisation. "We were not told", "we were not consulted", "we had no opportunity to provide information which would have resulted in a better decision". these complaints are very familiar. Equally familiar is the converse from the management side. "He (or she) is lazy"; 'no commitment to the library", 'not prepared to take responsibility". . . The outsider can hear both sets of complaints.

Meeting with individuals, or with groups, informal and unattributable comments will be made to the consultant. Junior library assistants can be particularly revealing in such circumstances, with comments on what they are doing, the attitude of their bosses, and the training (or lack of it) they have received. These comments are often disingenuous and misleading, sometimes more revealing of the personality of the individual than the health of the organisation, but the skilled consultant will quickly be able to distinguish truth from imagination as he becomes more and more familiar with the environment of a particular library. He should also have access to such revealing statisics as absence and lateness records, very good indicators of underlying morale.

The data gathered from such meetings can be matched with the formal and the informal communication structure of the library. How are decisions made and promulgated at all levels? How do members of department A find out about and influence decisions made in department B that impact on their own work? Fundamental communication blockages, previously invisible to library management, suddenly become blindingly obvious with the help of the outside eye.

Does a consultancy achieve a better library?

A consultancy could be a failure for more than one reason. It should not be attempted if the library director is unenthusiastic, and the consultants must be acceptable to him. If there is no trust between the director and consultant the exercise will fail. It is inevitable that the consultant will make many un palatable suggestions doing his work; any hints that the consultant does not have the backing of the director wil be picked up at once.

The consultant must have considerable social skills, rather different from those of a manager. Considerable patience with what must seem at times stubbornness, and an acceptance that the ultimate decisions do not lie with him. To use a medical analogy he is a psychiatrist rather than a surgeon. The patient must help himself. No knife can be used. If personal relations show signs of breaking down under the stress of the consultancy it should be abandoned.

The library which I direct is now near the end of the second year of a staff development consultancy. Its "culture" has changed for the better as a result. Individuals, including

myself, have become more perceptive and perhaps more effective managers because of the stimulus of the exercise. A number of organisational changes have been made, although not so many as were made in the two years before the consultancy began, when many systems were deliberately altered fundamentally. The internal governance of the Library, however, has been considerably improved. The library has a strategic plan of higher quality than if it had been produced without such outside assistance. My favourable comment are the view from the office of the library director, but they would be echoed by my senior management team and I believe, by the majority of the library staff. There has been a genuine change atmosphere, with greater input by people at all levels into how things are done in the Library. I believe there is a feeling among junior members of staff that they have more "say" about how their jobs should be carried out. The process has been a mixture of excitement an frustation. The amount of additional work required cannot be overstressed, but nor can the pleasure of having individuals of stature and perception working with you on the central problems of achieving better service within your own library. It is too soon within my own Library to state categorically that the benefits to individuals and the organisation will be parmanent; but there is substantial optimism that the uplift in morale, and new found commitment to the positive development of the Library's services, will result in lasting and tangible benefits for our users.

Why User Education and how can Information Technology help?

Nancy Fjällbrant
Deputy Librarian, Chalmers University of Technology,
Göteborg, Sweden

1. The role and organization of user education

What is the role of user education? One aim is to make the user aware of the information resources available, both directly in the library and from external sources. A second goal is to enable the user to enjoy the search for information.

User education can be organized at several levels: orientation for new users of libraries and/or information services; programmes of information retrieval for undergraduate students; courses in information retrieval for postgraduates and/or research workers; courses for academic staff; continuing education – courses for "external users". During the last twenty years there has been a growing emphasis on programmes of user education in many Nordic academic libraries, particularly specialized libraries for engineering, medicine and economics. Many of the Nordic user education programmes reflect the new methods for information storage and processing. This paper will examine some of the effects of information technology as applied to user education.

2. The main features of information technology

We sometimes talk about the present period as "The Age of Information Technology". The main features of recent development in information technology can be summed up as follows:

- Increased computer power leading to speedier and cheaper computer processing;
- Cheaper data storage – for example optical storage media;
- Digitization of information – text, graphics, photographs, speech, sound, video, etc.;
- Better data transfer between different systems and media;
- Improved telecommunications, such as ISDN, with greatly increased capacity for data transmission;
- Decreased size of equipment;
- Increased reliability of hardware and software.

These have led to the development of international, national and local online systems, automated library systems, public access catalogues (OPACS), the electronic journal, electronic "knowledge banks" and expert systems, CD-ROM (Compact Disk Read-Only-Memory), optical digital disks, and interactive video for storage of databases, journals, reference publications and picture databanks. There has been a very considerable increase in the amount of information available in the form of full-text documents, bibliographical references, factual and numerical data and, at the same time, an increase in the complexity in information handling and storage systems.

Any systems are beginning to exist in parallel – paper-based media and documents stored in digital form either locally, in online full-text stores, or on optical media. This points to an increased need to teach information users how to select and use the most suitable tools for their information needs.

3. The use of online databases

3.1. Library catalogues

The first automated library systems were run on mainframe computers which had high processing and storage costs and were often shared between several users. The next generation was based on minicomputers, often providing dedicated stand-alone library systems. These did not greatly reduce costs but gave the libraries better control over the system. The present trend is towards the use of microcomputors, either used singly or in networks. The cost will thereby drop and automated systems become more affordable. Online Public Access Catalogues (OPACs) or public enquiry terminals have brought about considerable improvements for the user with regard to searching for literature, particularly that available in book or monograph form. OPACs need a simple and straightforward user interface in order to be easy to use for inexperienced library patrons. At the same time they must be based upon fairly sophisticated search techniques in order to be able to deal with the complex library catalogue files. Computerized library catalogues are based on the standardized MARC record. Today many OPACs unfortunately do not fully exploit the information stored in the record, but only allow users three types of access: author, title and subject and show considerable resemblance to the library card catalogue entry. It would be possible to structure MARC records so that any separately tagged data element would be accessible, in Boolean combinations with any of the others. Many investigations have shown the importance of subject searching in the OPACs and much development work is being directed towards enhanced subject searching (Walker and Jones, 1987; Dempsey, 1988).[1, 2] The possibility of transaction logging enables the librarian to be able to follow unobtrusively how users actually use the OPAC. This provides valuable information for systems design and also for the design of appropriate user education modules.

How does the development of library automation and OPACs affect user education programmes? Frances Nowakowski has recently compiled an annotated bibliography on Bibliographic Instruction for Online Public Access Catalogues. This is divided into four parts (1) Bibliographic instruction for OPACs in general; (2) Specific systems; (3) Survey results affecting bibliographic instruction; (4) Survey instruments. (Nowakowski 1988).[3] The bibliography includes both theoretical and practical papers and aims to provide a useful resource list for those designing user education programmes in relation to the OPAC.

3.2. Bibliographic database – local, national, international

There are now over 5,000 publicly available online databases running on host computers on over 500 information retrieval systems. The relative complexity of the first information systems led to a situation where the one-time or infrequent end-user often asked for help from an intermediary or information specialist with systems knowledge. More and more end-users are, however, learning to carry out their own online information searches. This is partly the result of improvements in hardware and software and partly due to the problems of describing exactly the information required to an intermediary – the search negotiation process – no-one can judge the relevance of possible interest of information as well as the user.

Database structures vary considerably and depend on the producer. There is no recognized universal format and little trend towards standardization. Present-day information retrieval languages are command-based and fairly complex. Most host systems have their own specific search languages, sufficiently similar to be confusing to the infrequent user.

Even given the current disparity between systems and databases, it is possible to train end-users to carry out their own searches, providing this is limited to one host system and a small number of databases. There are a number of tools available for this purpose; general manuals or textbooks, documentation produced by the systems' operators, video films and computer-

based simulations or CAI (Computer Assisted Learning) programs and emulation programs (Fjällbrant, 1988).[4]

User education about online searching is concerned with:

1. Orientation about what online search facilities are available, to what extent users can obtain access to such systems (either with the help of an intermediary or themselves), where searching can be carried out and how much it will cost.
2. Instruction in how to prepare and carry out searches.

Three types of skill are necessary for carrying out interactive computerized information searches: subject knowledge; skill in using the terminal or PC; knowledge of the information system to be used – the appropriate commands, type and quantity of information available, database structure, etc.

The following factors have contributed to easier online searching for end-users: the vast increase in the number of personal computers; improved telecommunications hardware and software; and the development of user-friendly communication programs which enable the end-user to prepare a search offline, taking as much time as necessary and being able to correct mis-spellings and typing errors. The development of standardized search command languages such as the European Common Command Language. User friendly systems have been developed by a number of systems operators. This interface provides an easy menu-driven user access to databases on the specific host system. Examples are BRS's AFTERDARK and DIALOG's KNOWLEDGE INDEX. Finally, the use of artificial intelligence and expert systems to provide user-friendly interfaces where the user can communicate with the system and databases in natural language.

One problem for the end-user is that, if searching is carried out at infrequent intervals, it is possible that the search commands feel unfamiliar. One way to overcome this is to make use of "refresher training" in the form of simulation programs in which the user practices offline on a simulation of the online system. A number of simulation programs are available. Examples are 'MEDLEARN', QUESTSIM (ESA-IRS), DIALSIM (DIALOG) and STN-MENTOR programs.

3.3. Videotex databases

Videotex is the name for screen-based systems that make use of the telephone and television sets. Viewdata (sometimes simply called videotex) is a computer-based interactive service which uses the public telephone network to transmit information and the TV-screen as a display device. Examples of viewdata are British Telecom's Prestel service, established in 1979, Bildshirmtext (BTX) in West Germany, Teildon in California, the Pronto home-banking system of the Chemical Bank in New York, and the Teletel system of France.

It is impossible to access large database vendors through videotex. Examples are The Source, originally a consumer-orientated system which has moved into business information, and Dow Jones with an almost exclusively business focus. Searching is menu-driven. In Britain a number of agricultural organizations have been made user-friendly for inexperienced users, but the menu-driven searching is time-consuming (and therefore fairly expensive). Searchers used to the traditional command-driven online services often experience frustration in videotex searching.

If the library has access to a videotex system, this can be used for providing library news – opening times, services available, schedules of courses, their content and possible cost. Videotex services can also be used for interlibrary lending transmissions, as well as access to databases. A short demonstration of available videotex services and locally available databases would be of interest in a user education programme.

4. Optical storage of information

Recent developments in optical storage technology have provided a cheap storage medium for information. At the beginning of the "seventies" Philips introduced an optical video system-laser vision discs. These contained video pictures encoded in analogue form on a 30 cm optical disc. The first discs were intended for entertainment and the pictures were stored in a straight sequence through the 54,000 tracks in Constant Linear Velocity (CLV) format. Later, storage in the Constant Angular Velocity (CAV) format was introduced, with one picture per track. This allows a unique address for each frame and the possibility of searching and rapid access. This meant that the laser discs could be used for educational and training purposes and for storage of picture libraries or art collections. Examples of this type of use are at the Library of Congress for the storage of prints, poster and photographs (Welsh, 1985)[5], the British Domesday II project (Leah 1987)[6], and the Emperor-I project (Chen, 1986)[7]. The latter is a joint project between the Peoples' Republic of China and the USA, with the aim of presenting the archaeological finds associated with the grave of the first Chinese emperor Qin Shi Huang Di. These include the army of terracotta soldiers at Xian. Laser discs can be used to introduce users to picture databases.

Compact discs are a type of digital optical disc which are 12 cms in diameter. Compact discs are the result of cooperation between Philips (optical storage technology) and Sony (error correction coding) which started in 1979 and led to a commercial product – the Compact Audio disc in 1983. CD-ROM stands for Compact Disc – Read Only Memory and is a further development of the CD-Audios. Good overviews of the development of Compact discs and CD-ROM are given by Hendley, 1987[8] and in the book CD-ROM the new papyrus (eds. Lambert and Ropiequet, 1986).[9]

A 12 cm CD-ROM disc contains approximately 8 billion pits burnt into a 5 km track. The disc can store 550,000,000 bytes of information. The CD-ROM disc is, therefore, an excellent storage medium and can be used together with widely available low-cost micro- or personal computers to provide relatively powerful distributed storage and processing devices, which are not dependent on telecommunication systems. Material that has been created electronically – such as databases – can be saved and distributed in this form.

In user education programmes, databases in CD-ROM form can be used with advantage to provide end-user access to databases. They allow the user to work at their own speed without having to worry about telecommunication connect charges or costs for host computer time. They eliminate telecommunication faults, which can be a problem with online searching. The 1990 edition of CD-ROMs in Print has over 600 entries of commercially available CD-ROMs. These include many databases and reference tools such as encyclopedias.

There are some disadvantages in using databases in CD-ROM form. Present-day technology is directed to single user stations, though network alternatives are beginning to emerge. The biggest drawback is that the databases are updated less frequently than the online base. Although there is a considerable degree of standardization in CD production, size, error-coding, etc., there is little standardization of the search languages, so that users are today faced with over 100 alternatives. This is another example of the increasing complexity of the information world. It is important to provide clear instructional material in printed and/or digital form for the user.

5. Document ordering and delivery

It is not possible, by means of the online systems described above, to obtain bibliographic references within a matter of hours. Obtaining the corresponding documents can, however, take from a few days to several weeks. It is very important, in user education, to describe the document ordering and delivery service, so that the user is aware of the options and costs

involved. Choice of method for document supply is important with respect to three criteria: (1) chance of satisfaction; (2) speed of delivery; (3) cost. For both users and librarians it is important to make a good choice of document supply system and balance these factors. For example, study of the pattern and time for publication can make the user aware that it may be easier to obtain a journal article which corresponds to a somewhat older conference paper. It is usually easier to obtain the former.

The typical requirements of the end-user with regard to full-text documents may be summed up as follows: The right information, at the right time and for a reasonable cost. This is based on:

1. A straightforward system that is easy to use.
2. High chance of satisfaction – for the requested documents.
3. A reliable system.
4. Reasonable speed of supply – with the possibility of fast transmission for urgently required documents.
5. Low costs.
6. The facility to assess content, quality and cost before ordering.
7. Document output in a form that will permit the reproduction of text, diagrams, photographs and formulae.

Recent technological developments in computing and telecommunications will certainly affect future document supply and these could form a topic for discussion in an advanced course on information retrieval (Braid 1989).[10] Speed of delivery from a document supplier or library can be much improved by Group 4 telefax transmission or by satellite transmission of documents. The latter is particularly important in countries which have rather poor terrestrial telecommunication lines, or where such lines can be disrupted by earthquakes, landslides etc. Group 4 telefax is based on digital transmission over a digital datanet – ISDN or Integrated Digital Services Network – and results in high quality copies (300 lines per inch) at a speed of about 16 secs per A4 page. The use of Group 4 fax transmission should lead to a rapid, reliable and cost-effective document delivery service in countries where ISDN networks are available.

6. Electronic publishing including fulltext databases

In the last ten years a number of technologies have been developed which allow local access to fulltext documents. This means that users will potentially be able to obtain vast quantities of information directly from a personal computer. This access can be achieved in many forms: fulltext online databases, electronic journals and newsletters, CD-ROM, digital audio tape, laser cards or smart cards. These provide alternatives to the traditional paper publishing medium. A presentation of the new media could form an interesting discussion topic in an advanced course in the use of information sources.

Computer storage costs continue to decrease with improved VLSI techniques and methods of optical storage. This facilitates storing and handling full-text documents in digital form, for example on CD-ROM discs. This in turn could lead to a reduction in the handling costs for document suppliers and to the possibility of fairly cheap distributed document supply with CD-ROMs available for end-users. The development of user-friendly gateways will make it easier for users to locate and order documents directly from suppliers. Cheaper storage and telecommunications will facilitate the transmission of fulltext documents, as mentioned above.

The DOCDEL projects, sponsored by the European Commission, included work on full-text electronic journals – the Electronic Magazine, produced by Learned Information, U.K.

Electronic journals in Chemistry – prototypes of the electronic Journal of Chemical Research (Synopses) and Chemical Communications, the Royal Society of Chemistry, U.K. and a mathematical online journal, by the Commissariat a l'Energie Atomique, France. Another DOCDEL project was concerned with the electronic publishing of patent information (Fachinformationszentrum (FIZ 4) and Gesellschaft für Information und Dokumentation, BRD) and this has resulted in a database PATDPA available via the STN online system (Van Slype, Page & Halm, 1987).[11]

Patent information is based on both text and graphics and forms a particularly interesting area for optical storage and publishing media. The American US Patent and Trade Mark Office (USPTMO), the European Patent Office (EPO) and the Japanese Patent Office (JPO) are involved in a cooperative project involving the storage of patents on optical discs.

CD-ROM provides a medium suitable for the publication of reference works such as encyclopedias and dictionaries, patents and standards, textbooks, technical documentation, fulltext journals, and referral databases such as those corresponding to secondary publications. In particular CD-ROM has many advantages for the production of reference works, which do not require continuous updating. It has some disadvantages as a medium for referral databases and learned journals in that the publication pattern is serially dynamic and there will be problems in updating.

CD-ROM can be used for fulltext journal publishing, which could potentially greatly improve document access. In this connection two projects can be mentioned – ADONIS for biomedical journals (Stern, 1988)[12] and the INSPEC IEE and IEEE project within electrical, electronic and computer journals.

7. Construction of personal databases

An increasing number of library users now have access to a terminal or personal computer. These can be used to store references in a personal reference system. This involves the design and construction of a small database system. An advanced user education course could well include the design and use of a computerized personal reference system. The course could, for example, start by briefly describing what is meant by a database, and data management systems. This could be followed by guidelines for the structure of a bibliographic database and examples of software for personal reference systems. Students would preferably be given the practical opportunity to design and use their own personal reference file.

8. The use of electronic mail

A relatively new form of communication is electronic mail. It provides a semi-formal method of direct communication which can be extremely useful in that it is quick and relatively cheap. In contrast to telephone messages the recipient does not have to be at the receiving terminal, thus global timedifferences are of little of no importance. The term electronic mail or E-mail covers the transfer of digital messages from one computer terminal to another. There are a variety of E-mail services available:

1. Public Access Systems. A number of these are provided by the telecommunication companies in various countries, for example: United Kingdom – Telecom Gold, Sweden – Telebox.
2. Services available for the use of specific user groups, such as academics and research workers. Examples are ALANET a service for libraries, based on Dialcom software, provided by the American Library Association, and Advocnet used as a link between people working in vocational education. In the United Kingdom there is the COPOST Network started by the Council of Polytechnic Libraries, but now extended to university and national libraries.

3. Many firms provide privat E-mail systems to link their employees based on one or more sites.

One problem with electronic mail has been that the various systems do not necessarily communicate with other. One way of achieving communication between different systems is by means of a gateway service such as BITNET. BITNET (Because It's Time NETwork), launched in 1981, is a network of institutional and departmental computers at some 400 institutions of higher education and research centres in the United States. BITNET also has connections to NET North (Canada) and EARN (Europe), and has nodes in Chile, Japan, Korea, Israel, Mexico, Taiwan and Singapore and planned extensions to Australia and China. Bitnet provides gateway links to other E-mail networks such as ARPANET (Defense Advanced Research Projects Agency), CSNET, UUJCP, and national academic networks such as JANET (United Kingdom) and SUNET (Sweden) – Adams, 1990.[14] It is hoped that the recent introduction of the CCITT X.400 standard for electronic mail protocols and its gradual adoption will lead to considerably better communication between systems. The use of a standardized protocol means that messages will be able to be switched independently of the carrier.

One particularly interesting aspect of electronic mail is that it can be used to provide electronic conferencing facilities between users interested in a specific field or topic. This allows the users to exchange news and views and to seek advice from others with similar interests. Examples of such conferencing systems are COM developed by the Stockholm University computing centre QZ and the British CIX (Compulink Information Xchange) system. A user can select which conference(s) to belong to. Many of the conferences are computer-oriented, covering such areas as the use of certain types of software or hardware.

In additon to the conference systems there are also Bulletin Boards, where one message is sent to a group of users. These tend to be much smaller systems. Many bulletin board systems can be used for the price of the telephone call to connect in to the system. They can provide articles about the use of a given PC such as the Macintosh. Many include a facility for leaving a message.

The topic of electronic mail provides an interesting example of changes in the pattern of communication between workers and practitioners, and such, merits inclusion in a general introduction in a user education programme. It can well be introduced at a practical level in advanced courses, where the following factors can be considered:

- How to select a suitable E-mail service for your needs. This can be based on:
- Whom do you want to communicate with?
- What type of materials do you wish to send/receive – mail, diagrams, etc.
- Which systems do they use?
- What hardware is available – can you use existing equipment?
- Is the system user-friendly?
- Are there gateways to other systems?
- What will it cost? (Hardware, software, E-mail service fee, communications charges, training costs, documentation).
- Examples of existing relevant services.

9. Information technology and user education in a global context

Information technology has two main effects on user education. On the one hand, the growing complexity in information handling and storage techniques brings about a greater need to teach users what is available, how to choose the most appropriate tool for their needs and

how to use it efficiently. On the other hand, new methods of digital processing and storage provide excellent tools for teaching purposes. Information technology can break down barriers in the future. The new methods of storage and access may well prove to be invaluable for the development of systems for information transfer and document delivery in developing countries, for example by making databases available in an easily transportable form and by providing methods of document delivery where cost is independent of distance. It is important that the librarians of so-called "developed" countries share their technology products with third world countries. It costs considerable time and money to develop computer aided instruction programs. Let us try to share with other users throughout the world. This is perhaps an area where the international organizations, such as IFLA, FID and IATUL could play an important part.

References

1. Walker, S. & Jones, R.M. Improving subject retrieval in online catalogues. British Library Research paper 24, Boston Spa, British Library, 1987. ISBN 0-7123-3129-8.
2. Dempsey, L. (ed.) Influencing the system designer: Online public access to library files. Proceedings of Third National Conference, Bath 12–15 September, 1987. Oxford, Elsevier, 1988, ISBN 0-946395-31-4.
3. Nowakowski, F.C. Bibliographic instruction for online public access catalogues: An annotated bibliography, 1980–1986. In: Subject access and bibliographic instruction. Occasional papers series, School of Library and Information Studies, Dalhousie University, Halifax, Nova Scotia, 1988. pp. 71–93. ISBN 0-7703-9720-4.
4. Fjällbrant, N. Recent trends in online education. IATUL Quarterly Vol. 2 (1984) 4, pp. 228–236.
5. Welsh, W.J. Experiments with optical disc technology at the Library of Congress. In: '85 International seminar on trends and changes in library development. Kanazawa June 20–22, 1985. Kanazawa, KIT-LC, 1985. pp. 5-6-1 – 5-6-13.
6. Leah, T. Domesday II. The Micro User, Vol. 4 (1987) 11, pp. 32–37.
7. Chen, C.C. Sample interactive course development on the use of project Emperor-I videodiscs. In: 10th International online meeting. London, 2–4 December 1986. Oxford, Learned Information, 1986. pp. 323–328.
8. Hendley, T. CD-ROM and optical publishing systems. An assessment of the impact of optical read-only memory systems on the information industry and a comparison between them and traditional paper, microfilm and on-line publishing systems. Cimtech Publication No. 26. Hatfield, Cimtech, 1987.
9. Lambert, S & Ropiequet, S. (eds.) CD-ROM The new papyrus. Redmond, WA, Microsoft, 1986.
10. Braid, A. Document delivery – the dawn of a new era. IATUL Quarterly, Vol. 3 (1989) 4, pp. 207–213.
11. Van Slype, G., Page, J. & Halm, J. Evaluation of experiments in electronic document delivery and electronic publishing. Final report. Brussels, Commission of the European Communities, 1987.
12. Stern, B.T. ADONIS: the story so far. In: Oppenhelm, C. (ed.) CD-ROM Fundamentals to applications. London, Butterworths, 1988. pp. 181–219.
14. Adams, R. Communication and delivery systems for librarians. Aldershot, Gower, 1990.

La Maîtrise Stratégique de l'Information Composante Essentielle de la Formation des Ingénieurs

Jean Michel
Directeur, Centre Pédagogique de Documentation et de Communication
Ecole Nationale des Ponts et Chaussées
Paris, France

1. Les ingénieurs et la maîtrise stratégique de l'information

Il a été dit que les ingénieurs utilisaient désormais l'information comme une ressource primaire essentielle. On sait également (5) que l'information – sous toutes ses formes – représente désormais une part essentielle du coût de fonctionnement des entreprises modernes.

Alors, doit-on considérer que tout va bien? Doit-on considérer que l'information, aussi disponible et accessible que l'air, ne doit pas être gérée, «managée»? Doit-on se satisfaire de pratiques d'informations archaiques, fondées sur un pragmatisme dépassé, au moment où l'entreprise est confrontée à la concurrence internationale et s'efforce d'accroître la compétitivité de ses produits?

Toutes ces questions naissent du constat qu'en fait personne dans l'entreprise ne sait vraiment gérer le patrimoine informationnel, personne ne sait vraiment mettre en oeuvre une politique active de management de l'information, personne n'est en mesure d'évaluer les conséquences désastreuses d'une mauvaise maîtrise de l'information spécialisée.

Si beaucoup d'efforts ont été faits dans les dernières années pour améliorer le management des ressources humaines, si des modes se sont développées amplement dans le domaine de la «communication» (l'entreprise est desormais plongée dans un univers de signes et de médias), par contre, rien n'est sérieusement fait pour gérer l'information scientifique, technique, économique, encore appelée information spécialisée.

Lorsqu'on visite des entreprises, lorsqu'on interroge des ingénieurs, il est courant de relever les dysfonctionnement suivants:

- très peu d'ingénieurs et de techniciens visitent des bibliothèques ou utilisent des centres de documentation et encore moins interrogent des bases et des banques de données;
- beaucoup de professionnels (ingénieurs ou autres) produisent en permanence de l'information spécialisée (essais en laboratoires, spécifications techniques, dessins, notes de synthèse ...), mais, à l'exception de quelques grandes sociétés, rien n'est fait pour gérer correctement ce patrimoine informationnel;
- une majorité d'ingénieurs ignorent les régles de base relatives à la protection de leurs idées, de leur savoir ou savoir-faire: comment et pourquoi breveter une invention, comment se prémunir contre les menées d'agents de renseignement (espionnage industriel ...);
- une incapacité à trier et à déceler l'essentiel parmi des flots surabondants d'information et de documentation et une difficulté sérieuse à extraire, par analyse statistique, des lois de comportement à partir de multitudes de données hétérogènes;
- de sérieuses difficultés pour les ingénieurs à échanger des informations spécialisées, à communiquer leurs projets a des décideurs, et plus généralement à communiquer avec des spécialistes de disciplines differentes.

On peut énumérer ainsi une longue série d'insatisfactions qui au fond renvoient à une seule et même interrogation: a-t-on jamais formé ces ingénieurs à savoir se comporter face à cette exigence de l'information efficace?

Mais avant d'aborder très concrètement la question de la formation des ingénieurs, il est souhaitable de préciser certains termes et de définir les concepts de management de l'information ou encore de maîtrise stratégique de l'information (MSI).

Information, oui bien sûr. Mais de quelle information parle-t-on? En ce qui concerne les ingénieurs, il s'agit de tout ce qui est relatif au savoir-faire de ces professionnels (information scientifique et technique, par exemple), mais aussi de tout ce qui a trait à l'environnement dans lequel les ingénieurs travaillent: l'entreprise, le marché, la concurrence, les technologies, les coûts, les ressources humaines, le droit international, etc .. L'information dont les ingénieurs ont besoin est à la fois donnée brute (des chiffres, des faits) et aussi note, document, rapport (des textes, des références bibliographiques); l'information est donc primaire ou secondaire (selon la terminologie des spécialistes de l'information). Cette information est fondamentalement complexe, multidisciplinaire, contrastée, voire contradictoire. Elle est véhiculée, de différentes manières: contacts et échanges interpersonnels, supports écrits ou audiovisuels... L'information à prendre en compte est également un mélange de données ou documents produits par l'entreprise et ses spécialistes (information interne) et de ressources informationnelles ou documentaires externes à l'entreprise.

Maîtrise de l'information, *management* de l'information: ces deux mots signifient clairement que l'on veut se préoccuper de l'ensemble des activités relatives au processus d'information. En d'autres termes, on s'interesse tout autant à la production de l'information qu'à sa recherche ou son utilisation. On se préoccupe ainsi de savoir comment les ingénieurs produisent de l'information, comment l'entreprise gère ensuite l'information ainsi proudite: il faut savoir que les ingénieurs utilisent en priorité cette information produite au sein même de l'entreprise. On se soucie également de savoir comment les ingénieurs accèdent à des gisement d'information, comment ils formulent leurs besoins en information et comment ils mettent en oeuvre des processus de recherche de données ou de documents. Maîtrise ou management de l'information, cela signifie clairement gestion des stocks et gestion des flux d'information, évaluation économique des choix de solutions informationnelles, implication de différents acteurs ou intervenants professionnels.

Maîtrise *stratégique* de l'information: pourquoi un tel qualificatif «stratégique»? La raison principale du choix de cette appellation réside fondamentalement dans le constat que l'ingénieur est un élément déterminant du fonctionnement de l'entreprise. Au fond, le besoin en information de l'ingénieur est une composante du besoin en information de l'entreprise dans laquelle l'ingénieur travaille. Il ne s'agit donc pas seulement de penser la maîtrise de l'information comme quelque chose qui relève de préoccupations personnelles ou individuelles de l'ingénieur. Il s'agit bien plus sûrement de resituer cette maîtrise de l'information dans le cadre de la stratégie de l'entreprise, en prenant en considération l'ensemble des facteurs de compétitivité et l'ensemble des contraintes qui pèsent sur l'entreprise.

Ainsi donc *la maîtrise stratégique de l'information* (MSI) est cette aptitude que les ingénieurs doivent posséder s'ils veulent jouer pleinement leur rôle d'operateur de changement dans les entreprises. N'oublions pas que fondamentalement les ingénieurs transforment de l'information et du savoir pour pouvoir faire réaliser les produits ou services de l'entreprise. A la limite, l'action des ingénieurs peut se décrire comme un processus permanent de mobilisation, transformation et production d'information.

2. Former les ingénieurs à la maîtrise stratégique de l'information

Parmi les spécialistes des questions de formation d'ingénieurs, il est courant de distinguer plusieurs écoles selon que l'on considère l'ingénieur comme un généraliste ou comme un spécialiste et selon que l'on situe cet ingénieur dans la sphère de la technique ou dans celle du management. En Europe, notamment, il est tout à fait normal de voir ces points de vue, soit

cohabiter, soit s'opposer, soit s'ignorer (6).

Pour certains donc, l'ingénieur est au mieux un «super technicien»: d'«engineer» à «engine» la liaison sémantique est alors directe et prédominante. Dans ce cas, l'ingénieur apprend son métier en acquérant des «recettes» techniques, en fabriquant lui même des objets techniques et en essayant de s'intégrer à des entreprises pour des stages de terrain, généralement appréciés.

Pour d'autres, l'ingénieur est d'abord et avant tout un scientifique, c'est à dire un spécialiste d'une certaine discipline scientifique. Dans cette situation, l'ingénieur est très tôt inscrit dans un département approprié d'une Université technique, où il peut faire progresser son savoir au contact de professeurs, spécialistes éminents de la mécanique des roches ou des systèmes experts. Le travail de laboratoire et de recherche est alors une composante essentielle de la formation.

Pour d'autres enfin, l'ingénieur n'existe que par la réponse globale qu'il peut apporter à des besoins des hommes et de la société; il est principalement un «assembleur» de techniques et un gestionnaire de ressources diverses. Dans ce dernier cas, la formation met l'accent sur la multidisciplinarité et sur l'approche par les «besoins» et par l'économie.

On aura pu reconnaître dans cette présentation des cultures différentes de formation d'ingénieurs. Il faut donc bien comprendre que l'introduction d'enseignement à la maîtrise de l'information sera conditionnée par le choix du modèle de formation et par l'environnement culturel dans lequel on opère.

Ainsi, selon que l'on s'interesse à l'ingénieur-technicien, à l'ingénieur-scientifique, ou à l'ingénieur-manager, les objectifs, les programmes et les pédagogies des formations à l'information diffèreront assez sensiblement.

C'est la raison pour laquelle il est important que chacun, dans son contexte, puisse trouver la voie la plus appropriée (7).

Cette remarque préalable étant faite, on peut donner quelques règles générales et formuler quelques propositions acceptables dans et par un grand nombre d'établissements.

Des actions de formation avec différents niveaux d'implication

Le minimum qu'il serait logique de trouver dans toutes les universités techniques et autres écoles d'ingénieurs est celui d'une sensibilisation générale aux méthodologies de l'information et de la documentation. Cette initiation touchant tous les étudiants devrait à priori être faite dans les premières années de formation et devrait permettre aux étudiants de pouvoir utiliser au mieux les ressources informationnelles et documentaires à leur disposition à l'université ou dans les entreprises.

Un second niveau relèverait d'une approche déjà plus spécifique du travail de l'ingénieur. Il s'agirait principalement d'introduire des modules de formation s'adressant à des étudiants en fin de scolarité et conduisant à développer des apprentissages relatifs à la maîtrise stratégique de l'information, en tant que composante du travail quotidien de l'ingénieur.

Enfin, un troisième type d'action de formation concernerait ceux des étudiants et des ingénieurs qui pourraient inscrire cette compétence particulière dans la panoplie de leur spécialité. En d'autres termes, former par des options ou cycles particuliers, des spécialistes de la maîtrise stratégique de l'information ayant la double compétence «ingénieur» et «spécialiste de l'information». On pourrait ainsi imaginer former des ingénieurs spécialistes de la veille technologique.

Des lieux multiples pour la formation à l'information

Une autre façon d'aborder la question de la formation à l'information est de considérer tous les «lieux pédagogiques» où cette formation peut être envisagée.

Il y a bien sûr ce lieu privilégié qu'est la formation initiale des ingénieurs. Mais il existe d'autres lieux qu'il ne faut pas négliger:

- la formation par la recherche et les formations doctorales constituent un terrain privilégié pour l'introduction de modules de formation à la maîtrise de l'information;
- la formation continue des ingénieurs est également un cadre intéressant pour développer des expériences originales: apprendre par example à des ingénieurs en activité comment prendre des brevets, comment défendre et protéger ses idées, comment se prémunir contre les espions. La veille technologique serait notamment un thème privilégié pour des actions de formation continue destinées à des ingénieurs de 35 à 40 ans.

Des contenus de formation attractifs

Il faut tout de suite affirmer qu'en aucune façon il ne s'agit de former des documentalistes, pas plus qu'il ne s'agit d'apprendre aux ingénieurs les subtilités et les fondements des règles de catalogage des documents écrits.

Les échecs souvent constatés dans les expériences de formation des ingénieurs à la documentation tiennent à une confusion d'objectifs; la formation spécifique des ingénieurs à la formation ne saurait être en aucune façon une formation centrée sur les «recettes professionnelles» des documentalistes et conservateurs de bibliothèques.

Cette formation spécifique devrait plutôt renvoyer à des contenus ou interrogations tels que les suivants:

- comment définir et formuler ses propres besoins en information ou ceux de son entreprise?
- comment estimer le coût d'un processus de maîtrise de l'information et comment décider en conséquence du meilleur choix de solution ou d'investissement?
- comment accéder à l'information, à travers des sources multiples?
- comment trier l'information, comment évaluer la documentation recueillie, comment établir des synthèses?
- comment gérer l'information produite ou collectée?
- comment stimuler la production d'informations pertinentes à l'intérieur de l'entreprise?
- comment valoriser des savoirs et des savoir-faire, comment breveter, comment normaliser, comment diffuser?
- comment observer l'environnement, comment exploiter bases et banques de données dans une perspective de veille technologique?
- comment intégrer l'information et la documentation aux processus de conception (CAO, Analyse de la Valeur ...)?
- comment constituer, au sein de l'entreprise, des systèmes fonctionnels de maîtrise stratégique de l'information spécialisée?

Cette liste de question ne prétend pas épuiser le sujet. Il va de soi que chaque établissement de formation peut tout à fait définir des contenus plus spécifiques (8).

Des modalités pédagogiques efficaces.

Si la visite de la bibliothèque centrale ou du centre de documentation reste la pédagogie la plus largement répandue, elle ne saurait constituer la colonne vertébrale pédagogique de ces formations à la maîtrise de l'information. Il faut beaucoup plus. Il faut impérativement que ces formations – initiation comme approfondissement ou spécialisation – soient explicitement intégrées dans le cursus de formation des ingénieurs. Des cours doivent être proposés aux étudiants, des seminaires doivent être organisés. Des travaux personnels sont à prévoir, de même que des projets collectifs sont à imaginer. Enfin, l'intégration doit être telle que les thèses ou mémoires personnels de fin d'étude des étudiants futurs ingénieurs doivent impérativement comprendre une composante «maîtrise de l'information» relative au sujet traité.

3. Penser l'information et l'ingénieur de demain

Mais prenons un peu plus de recul et reformulons le problème dans les termes suivants: comment l'information va-t-elle transformer les conditions de travail de l'ingénieur de demain? Ou encore vers quel profil d'ingénieur doit-on aller?

Ainsi reformulée, la question de la formation des ingénieurs à la maîtrise stratégique de l'information (MSI) renvoie à la question même de la formation de l'ingénieur de demain.

Sans faire de prospective exagérée, on peut affirmer que l'ingénieur du XXIè siècle se démarquera profondément de l'ingénieur du XXè siècle par le fait que son métier sera de plus en plus influencé par le poids intrinsèque de l'information dans les produits et services pensés et offerts par l'ingénieur. De même, cet ingénieur du XXIè siècle sera de plus en plus confronté à des démarches nouvelles de mobilisation de la connaissance, élargissant toujours plus l'univers des possibles, et requiérant des méthodes de compréhension d'une réalité de plus en plus complexe, polysémique, systémique.

Les formations à la maîtrise stratégique de l'information pour les ingénieurs doivent donc impérativement anticiper (peut-être plus modestement rattraper) certaines évolutions. Citons en quelques unes:

La *démarche qualité* est aujourd'hui largement ancrée dans les pratiques des entreprises performantes. Or cette démarche qualité, a bien y regarder, n'est ni plus ni moins, qu'un processus de maîtrise de l'information. Le contrôle de qualité, les cercles de qualité, la qualité globale, l'assurance qualité, la fiabilité, la sécurité de fonctionnement, tout cela requiert une parfaite mobilisation et un traitement efficace de l'information. La confrontation d'informations en provence de différents secteurs de l'entreprise, l'analyse statistique des données, l'expression des salariés, l'analyse de la valeur et le cahier des charges fonctionnel, autant de pièces du puzzle information spécialisée à relier au concept de qualité.

Les *méthodologies de travail* et plus particulièrement les méthodologies dites de «problem solving» et d'analyse de système sont désormais amplement utilisées par les entreprises compétitives. Des méthodes telles que l'analyse de la valeur ou les techniques de créativité ont fait leur preuve et témoignent de l'intérêt porté au travail de groupe, à la formation fonctionnelle des besoins, ou encore à la notion de plan de travail pour la résolution de problème (9). Toutes ces méthodes ont un point en commun: l'indispensable maîtrise de l'information. L'efficacité d'un groupe vient de son aptitude à mobiliser, à traiter et à reformuler l'information disponible. Il y a un lien essentiel entre méthodologie d'une part, et information d'autre part (10). C'est ce lien que les ingénieurs n'ont pas encore complètement découvert et que des formations à la maîtrise stratégique de l'information doivent révéler.

La problématique de *l'ingénierie de la connaissance* constitue une troisième composante d'évolution. Intelligence artificielle et systèmes experts sont désormais des mots clés obligés du travail de l'ingénieur. Plus généralement, que l'on s'intéresse à la productique ou que l'on cherche à gérer des réseaux télématiques ou des réseaux d'assainissement, il est clair que la machine-ordinateur a avantageusement remplacé l'ingénieur, calculateur besogneux. Mais, derrière ou en amont de la machine, il faut la connaissance, le savoir, il faut des bases ou banques de faits et de lois. On remonte donc aujourd'hui à l'essentiel. Dans cette perspective, la formation à la maîtrise stratégique de l'information s'articule parfaitement avec une nouvelle ingénierie de la connaissance.

La mondialisation de l'économie, l'ouverture des frontières, la circulation des hommes et des biens introduisent une nouvelle donnée à prendre en compte dans toute prospective de la formation des ingénieurs: *la multiplicité et la rencontre des cultures*. Si depuis plusieurs années déjà, les responsables de formations d'ingénieurs ont imposé l'apprentissage des langues étrangères à leurs étudiants, il faut constater qu'aujourd'hui la connaissance de données de marketing international devient une nécessité. De même, la conception, la réalisation, la

commercialisation des divers produits industriels impliquent des acteurs répartis sur toute la planète et imposent donc à l'ingénieur de savoir travailler avec des partenaires d'origines, de cultures et de langues différentes. La maîtrise stratégique de l'information, c'est aussi cette réalité de la confrontation des cultures.

4. Quel rôle pour les spécialistes de l'information

Si, dans une Université Technique, ou dans une Grande Ecole d'Ingénieurs on imagine aisément le rôle que peuvent jouer des enseignants de mathématiques, de mécanique, d'urbanisme ou de biotechnologies, il n'est pas aussi simple de déterminer qui doit intervenir au niveau de la formation à la maîtrise stratégique de l'information.

Doit-on disposer d'enseignants (chercheurs) specialistes de ce domaine (mais existent-ils?), doit-on recourir à des enseignants des disciplines traditionnelles en leur demandant d'intégrer cette composante MSI à leur enseignement, ou doit-on faire appel aux techniciens de la documentation, aux documentalistes ou autres conservateurs de bibliothèques?

Il va de soi que l'idéal serait de disposer d'équipes enseignantes pluri-disciplinaires dans lesquelles interviendraient les divers spécialistes mentionnées plus haut: des théoriciens et des praticiens, des spécialistes de l'information et des experts de domaines techniques particuliers.

D'une façon générale, il ne paraît pas anormal que les personnels d'encadrement des bibliothèques ou centres documentaires des universités techniques interviennent activement dans les programmes de formation à la maîtrise de l'information et qu'ils en soient même les pilotes ou responsables.

Plusieurs conditions doivent néanmoins être respectées:

- d'abord existence de moyens techniques et en personnels suffisants et surtout performants;
- éventuellement création à l'intérieur de (ou en parallèle à) la bibliothèque de l'Université, d'une chaire ou d'une entité responsable du programme MSI;
- intégration dans une équipe enseignante MSI de personnes venant d'autres secteurs de l'université et surtout de spécialistes extérieurs à l'Université;
- impérativement, démarquage des programmes de formation à la MSI des traditionnelles sensibilisations aux fichiers documentaires et des visites à la bibliothèque de l'Université Technique;
- enfin et surtout, adoption d'un état d'esprit plus «ingénieur» que «documentaliste» pour une meilleure compréhension des besoins spécifiques des ingénieurs.

Sous réserve que ces conditions soient respectées, il peut s'avérer tout à fait judicieux que les spécialistes de l'information, cadres de la bibliothèque de l'Université Technique développent de nouvelles aptitudes professionnelles orientées vers la maîtrise stratégique de l'information, qu'ils conduisent des recherches dans ce domaine ou interviennent comme consultants auprès d'entreprises ou d'ingénieurs et qu'enfin ils contribuent pleinement à la formation des nouveaux ingénieurs.

Peu d'experiences convaincantes ont été menées à ce jour, poussant le plus loin possible cette logique de la maîtrise stratégique de l'information. Mais, il est fort probable que la décennie 1990–2000 sera déterminante en la matière et que des initiatives seront prises prochainement dans les cursus de formation des ingénieurs.

Références bibliographiques

1 Michel, Jean; Sutter, Eric; Vezier, Liliane. La recherche d'information dans les études d'Analyse de la Valeur in Documentaliste – Vol. 26 – Nov/Dec. 1989, p. 260–263.

2 Pinelli, Thomas; Barclay, Rebecca Q.; Glassman, Myson, Olin, Walter The value of scientific and technical information (STI), its relationship to research and development

(R&D) and its use by U.S. Aerospace engineers and scientists in European Forum organized by the Information-Documentation Committee of the Association Aeronautique et Astronautique de France Strasbourg, Jan. 1990.
3 Conférence des Grandes Ecoles – S'informer pour se former et agir. Paris, La Documentation Francaise, 1987, 173 p.
4 FMOI – Comité Information de l'Ingénieur Approche méthodologique pour identifier les besoins en information des ingénieurs. Paris, UNESCO, 1984, 49 p.
5 Bucksch, Ralf Une démarche pour l'application de l'Analyse de la Valeur à la communication et à l'information in 4e congrès international. AFAV – Paris, avril 1986 – p. 187–196.
6 Michel, Jean Les ingeniéurs à l'heure européenne: Ecoles, Universités, Corporations: l'atout de la diversité in Le Monde, 16 Mars 1989 – p. 32.
7 From Engineering Information to Engineering Education in European Journal of Engineering Education. Vol. 12 No 2, 1987 (special issue) pp. 111–194.
8 Michel, Jean Former aux heuristiques de l'information in Documentaliste. Vol. 26 No 4–5 Juillet–Oct. 1989 pp. 174–178.
9 Michel, Jean; Sutter, Eric Valeur et compétitivité de l'information documentaire. L'Analyse de la Valeur en documentation. Paris, ADBS, 1988, 140 p.
10 Walton, Kenneth R.; Dismukes, John P.; Browning, Jone An information specialist joins the Rand D team in Research-Technology Management. Sept. Oct. 1989 – p. 32–37.

Information Skills across the Curriculum

Ann Irving
Senior Lecturer, Department of Library & Information Studies,
Loughborough University of Technology,
Loughborough, UK

Abstract

There have been many changes in the way that we think about the library and librarian in the school of today. Because school libraries and librarianship have been so neglected and badly funded, it has been essential to think very hard about their relevance to teaching and learning, about their unique contributions to the development of young people's knowledge and skills, and about the way in which teachers want, need and use information during their daily work. I believe that some of the developments in the UK are worthy of a wider audience because they demonstrate the use of effective strategies and clear, sharp thinking about what information resources and services teachers and their students really need.

This paper is in three parts. Firstly, an outline of the problem addressed by the community of professionals involved in school librarianship. Secondly, some details of the strategies used to reach the goals we determined. Finally, some examples of the results of our efforts which will affect all the work undertaken in further, higher and adult education and training. Put simply, I believe that current activities in schools are not only harnessing the power of information technology to develop sophisticated information-handling skills among a much younger age group but also de-skilling librarians. Their expertise can now be shared among clients. More important, the use of information technology to gain access to world information services and systems diminishes the need for access to a library or librarian. Perhaps the students and workers of tomorrow, for whom many of your services exist, will arrive in your institutions already "information skilled".

Problems in schools

Three main problems have been addressed by teachers and librarians in recent years:

1. There are relatively few schools with professional librarians in most countries of the world. Where they exist, they are usually working without library assistants and without the back-up of inter-library networks. A librarian will be responsible for library provision for perhaps 1000 children and 100 teachers. Ways must be found of making them more efficient, for they are unable to devote much time to user training and preparation when there are so many tasks to accomplish and only one person available. In schools without librarians, the majority in fact, these tasks must be undertaken by a teacher in whatever spare time is available after teaching duties.
2. The time within which material must be provided to support curricular needs is generally very short, for school projects are set for weeks rather than months. Modern pedagogy makes learning more relevant to children's experience, with science teaching based on practical projects, and history teaching based upon the application of historical methods to local documents and artefacts, rather than on the memorising of theories and facts.
3. The modern curriculum requires access to information about current topics: acid rain, the greenhouse effect, oil pollution, biotechnology and comparative world religions are

among many topics studied by children today. The book publishing industry cannot respond quickly enough and teachers need access to a wide range of topical material including newspapers and scientific journals.

These problems – time and available expertise, enquiry-based learning and teaching, the need for highly current information – resulted in new thinking about libraries and librarians. The questions that arose were, for example,

What information resources are essential?
Where can they be obtained?
What information-handling skills are essential?
Who should develop them?
How can they be practised?
What materials and tools might help?

Over a period of about ten years, the British Library Research and Development Department funded numerous small projects to investigate these problems (1). There is now a significant body of knowledge and, even more exciting, a substantial amount of activity in schools with a very high level of interest among teachers in all aspects of information handling and use. The ball is rolling!

Strategies to promote information skills across the curriculum

The reports of school examination boards provide a clue to the skills required for successful study. Often, the reports mention the fact that students copy material from books without synthesis in Chemistry, or that they are unable to interpret photographs in Biology, or choose too broad a topic in Geography, or find graphs difficult to interpret in General Science. All of these skills are information-handling skills. The analysis of examiners' reports therefore provides plenty of material to guide anyone trying to foster the use of information resources. The points refer, however, not to the knowledge and use of specific information sources but to the skill required to make use of the information they contain.

Policy documents from government also provide clues. Educational reports point to skill needs and deficiencies but more important sources of inspiration are the documents from industry and their relevant government offices. These suggest manpower needs and skills, and allow educators to examine their curricula for relevance and preparation. A report on IT skills shortages suggested a need in industry for graduates with a whole range of communication and information skills as well as a knowledge of electronics. Few school teachers see such reports but they provide better arguments for improving the development of information skills than anything produced by educators themselves.

Most school systems include teams of inspectors who inspect resources and teaching regularly and advise and guide both government policy and school practice. In the UK, they meet in inter-disciplinary teams, so reaching any one is potential access to all. They hold staff training courses, and making presentations at these is a way of alerting them to the issues and to tactics for addressing them. The message about information skills, and the resource collections required to foster them was therefore quickly moved around the inspectorate, in all subject areas. This led to gentle influence on both policy and school practice as the inspectors moved around schools and areas in the UK.

Industry in all countries must concern itself with efficiency and profitability. It is easy to show how access to information and good use of it can make working more efficient. It is less easy, but not impossible, to show how the development of such skills at school can yield a better potential workforce at all levels – not just for those who continue their education to

graduate level. Securing the support of industry is crucial, for it is to industry that government must look for new horizons and income, through industry taxes, an earning economy, and an employed population. In the UK it was found that the support of several industrialists helped to add fuel to the debate so that the message was then reaching different government departments at the same time. If a message is heard in several places, it stands a better chance of being heard!

Finally, the teachers. Analysis of their curriculum plans, and a capacity to read between the lines, enables the inherent information skills to be detected. There is a need to analyse curriculum statements such as "Children should understand pollution control" to identify the cognitive processes involved in gaining and demonstrating that understanding. In this example, children would need to practically investigate pollution by local experiments, read about pollution control, synthesise and organise their findings and feelings, and then communicate these either orally or in writing. Only one part of this process might involve using a library, but it is impossible to consider this out of the total context of the assignment set by the teacher in order to achieve that understanding of pollution control.

The study of school assignments – the tasks set by teachers to achieve curricular objectives – is essential. If we do not know what task was set and what objectives are to be achieved, how can we adequately supply information to the student? Unfortunately, this is how many librarians function, and where much user education starts. Our task in the UK was to see what information was needed, when, where, and in which form. And then to try to deal only in the skills needed at that time. The term "library user education" was altered to "information user education". The difference is subtle, but it is important and changes the way we operate with teachers and students. It also, eventually, changes the way we provide information services, but more of that later.

Much teaching is subject-based. Few teachers see learning as a process. We have tried to uncover the processes involved in learning subjects and to reflect these. We have encouraged teachers to compare and contrast the process skills within their schools, to help identify which are common to all subjects and which are truly subject specific. As time goes by, everyone realises that few skills are unique to a particular subject. Interpreting graphs in geography is the same as interpreting graphs in mathematics. Evaluating evidence in history is the same as evaluating evidence in social studies.

Information technology makes this clearer. The use of computers in schools is well established, thanks to the initiatives of three different government departments, the IT industries, and the small core of enthusiasts who took the first steps in schools. Initially, most uses were of subject specific software but now there is widespread use of "generic" or "content free" software which facilitates the handling of data and information in any subject. The database package used in history is equally at home in the physics or geography classroom, for what it does is what humans do – it enables information to be processed, manipulated and presented in a variety of different ways and forms.

As information technology permeates the school curriculum, information skills development becomes a more prominent issue among teachers. Now, the new national curriculum gives equal weight to knowledge (subjects) and skills (learning processes), and the skills for learning are information skills. The curriculum aims and statements include those associated with handling information in all media. For the young scientist, there is an expressed need to make contact with the ideas of many scientists through secondary sources, and to learn different ways of presenting information about science to a variety of audiences. Some of these aims will require access to a library, but it may be that the best resource is a library serving scientists rather than schoolchildren. One of the outcomes of information skills acquisition by children, and of the curriculum demand for topical information, is that children at school

can make use of material aimed at other, older, often specialised audiences. Clearly, by the time they reach college or university, they will be familiar with some of the sources and services offered to older students and workers.

Wider horizons: some examples of current practice

Some schools in the UK and USA have begun to use online information services created for scientists and other professional workers and academics. The IT available in schools is cheap and simple by comparison, but its capabilities for online use are identical. In one British Library sponsored project, children aged from 8 to 18 years old have been learning to choose files and interrogate them for their school assignments (2).

The younger children were engaged in a workshop which involved them making decisions about survival and escape from a jungle. They had to investigate hazards on their chosen route – involving one boy in finding out how to treat snake bites – and work out how to cross rivers, how to deal with the climate, and how to negotiate with and manage a team. These children used some of the full-text databases available on DIALOG and PROFILE such as Everyman's Encyclopaedia and the national newspapers.

A group of 17–18 year old students investigated the French general election in 1988, using DATASTAR's Swiss news agency file to gain access to material that was both topical and in French. Two science students investigated aspects of physics, retrieving research papers, one on the acoustic properties of a wine glass. Other science students investigated biotechnology issues. History students examined Historical Abstracts for papers on Custer's last stand and the characteristics of General Custer's personality. In Religious Education, Religion Index and the UKMARC file on BLAISE yielded useful references on aspects of the creation story that could be contrasted with scientific views on the origins of mankind.

In all of these examples, the children were able to explore topical interests and concerns irrespective of the presence of a good library collection in their schools. The online services and systems were therefore widening the classroom horizons and enabling the teachers to be both more responsive to the children's interests and more adventurous in their choice of topics and teaching styles.

Some implications for librarians

The initial school problems of time, topicality and speed seem to be partly addressed by the use of IT systems to gain access to knowledge across the world. Most of our schools do not contain long runs of specialist periodicals, nor do they contain their abstracts and indexes. For schools using online services, access to such a wide range of information provides the essential resource to support the curriculum and acts as an opportunity to develop and practice information skills. Children learn to ask real questions and to phrase them in appropriate ways; they learn to sift from a mass of information; they learn to reject what is not relevant, and to evaluate the quality of what is judged relevant to their topic; and they learn how to focus their attention on what information is required for the task and how it should be integrated in any reporting or essay writing.

These processes are fostered by teachers, who can guide the learning by being present during the searching. Some of the schools have access from their classrooms whilst others travel to the school library where traditional resources can be used at the same time. They are naturally supported by librarians (where one exists) but since this is the exception rather than the rule in UK schools, it is important to help teachers develop information concepts and skills. All schools have teachers. Only a fraction have librarians (in the UK there are about 800 librarians in 8000 secondary schools and less than 10 in 20,000 primary schools).

The fact that all children attend school, and this lasts for a minimum of 11 years, makes

this sector of education very important. If librarianship is to make an impact on the whole population, the children in schools are a captive and responsive audience, and one day, they will be in positions of importance in all aspects of our society and government. We have had to encourage the development of information skills by working with and through teachers. This has been so successful that information skills are now documented alongside the requirements for subject knowledge in the UK national curriculum.

The pervasive impact of IT in schools has helped to make clients for IT based information products in a previously ignored but substantial market sector, and as these children grow up and move into work or higher education, they will surely expect to continue their access to information and knowledge, wherever, however, it is held. With access possible from a desk top, how will they react to librarians who restrict this in their libraries? Or who restrict access to other forms of knowledge to certain times of day, or days of the week? Many of our rules and procedures are now inappropriate for people who have learned that information is accessible at any time, from any place, on any topic. And the ultimate benefit of IT based services is that they make the task of finding exactly what is wanted so very much easier. Our children are experiencing such systems now, and they have a vision of what is possible that may lead them to new information pastures. The big question that remains is, will we be grazing in those new pastures?

References

1. Information skills in education. British Library Research and Development Department, January 1990. This free pamphlet outlines projects funded by the British Library. It is available from The British Library, R & D Department, 2 Sheraton Street, London W1V 4BH, UK.
2. Wider Horizons: online information services in schools by Ann Irving and Carolyn Carter. British Library R & D Department, Spring 1990 (LIR Report 80).

Development of Hospital Libraries in Sweden

Lena Sewall, Library Manager
Hospital Library, Karlstad Central Hospital,
Karlstad, Sweden

Abstract
Sweden has developed a special library form, i.e. the integrated hospital library, which provides both medical and general library service. With a few exceptions in Denmark, Norway and Great Britain, this kind of library is unique to Sweden. The author finds it surprising that other countries have not discovered this excellent library form and what potential it offers for regional collaboration, providing the advantages of both the specialized and the general library.

Swedish public libraries are well developed and compare favourably with public library systems throughout the world, perhaps not as real innovators but in administering and developing ideas that originated elsewhere. In some areas, however, Swedish public libraries have ploughed their own furrow. One of these is in the hospital library sphere where in Sweden a very special type of library has been produced – the integrated hospital library – that with a few exceptions in Denmark, Norway and Great Britain exists nowhere else in the world. The integrated hospital library, is a library that has both a medical and a general department, and that consequently functions as both a medical library and a patients' and staff library. It is surprising that more countries have not discovered the value of these libraries and what potential they offer for regional collaboration, providing the advantages of both the specialized library and general library provision.

In Sweden, the route to these integrated hospital libraries has been via patients' libraries, which developed unusually early and effectively, while specialized medical libraries developed remarkably late. These circumstances are quite unique to Sweden. In the world at large the reverse is the case.

The public-library inspired hospital library dates back to the 1920's, when the first patients' libraries were created through voluntary efforts. In 1921 there were 7 patients' libraries in Sweden with loans totalling 1,272 volumes. In the 1930's the organizational form arose, where public libraries would handle the work. This new form of collaboration between hospital and public libraries became common practice for general libraries (combined staff and patients' libraries). Today nearly all hospital libraries in Sweden are branches of public libraries.

Nowadays hospital libraries are financed almost entirely by the county councils – the responsible authorities for health care in Sweden. These councils usually commission the local authorities to run the hospital libraries.

During the 1950's and 1960's the activities of both public libraries and patients' libraries increased markedly. This upswing stems mainly from the competence and skill of the professionally trained librarians who handle the running of these libraries as well of course as the healthy economic climate of the time.

During this period libraries with a solely medical function were not so well developed.

A government inquiry carried out in the 1970's showed that most of the hospitals and nursing homes in Sweden had patients' libraries (80%) while just over a third (36%) had specialized medical libraries at their disposal. The majority of these specialized libraries were not

part of the public library system and were not run by trained librarians. Neither were most of them actual medical libraries, but rather unorganized collections of medical literature spread out among clinics and departments. Only a few medical libraries were in fact true medical libraries, run by qualified librarians.

The information explosion of the 1960's caused doctors and other hospital staff to call for a qualified professional library service. It then seemed natural for county council and hospital administrators to commission the professionally trained librarians who had been handling the patients' libraries so successfully, to shoulder the responsibility for running the specialized libraries. Thus we acquired many integrated hospital libraries in Sweden, that proved to be rational, efficient and economical. Integrated hospital libraries in Sweden are still growing, while there have never been more than ten or so purely medical specialized libraries in hospitals run by trained librarians.

The first integrated hospital library in Sweden was that in Falun, where the hospital librarian, Ulla Kjerrström, served indefatigably as a pinoeer of this new organizational form from the mid-1950's until the mid-1970's.

Over the past twenty years various surveys have dealt with the hospital library function in Sweden. Some have had great significance for the development of hospital libraries in our country and as a rule have dealt mainly or solely with general library activities in hospitals. They all share the same view on the goal of general hospital libraries and their organization.

1969 saw the National Board of Education's "Guidelines for Library Activities at Long-Stay Intitutions". These guidelines came to have exceptional importance for the development of Swedish hospital libraries, along with the standards relating to size and dimensions of hospital library premises, published the same year by SPRI (the Swedish Planning and Rationalization Institute or the Health and Social Services).

The reports issued by Spri at the end of the 70's and beginning of the 80's have also influenced the activities of the country's hospital libraries, one of them referring only to library premises for children's library activities. These reports have been very influential for the development of the physical library environment for both the medical and the general library activities of integrated hospital libraries, patients' libraries, and genuine medical libraries.

Later surveys have all been much influenced by the National Council for Cultural Affairs' study entitled "Hospital Libraries", that in 1976 proposed generous guidelines for the activities at and organization of the general hospital libraries in the country. "Hospital Libraries" does not discuss specialized medical library activity in detail, but offers views on its organization and recommends co-ordination between specialized and general libraries. "Hospital Libraries" also suggest that the county councils test the feasibility of setting up regional medical libraries to serve whole council areas – the organizational form intitiated in Karlstad in 1970.

The Federation of County Councils' study "The County Councils' Libraries, Specialized Medical Libraries and School for Nursing Professions' Libraries" is the only one that reviews the activities and organization of the specialized medical libraries. This study also recommends integrated hospital libraries and regional medical libraries.

A leading idea in the National Council for Cultural Affairs' study "Culture in the Care Sector" is that anyone admitted to a long-stay care institution has as much right as anyone else to partake of society's cultural facilities, and that all of society's cultural expressions shall, to the greatest possible extent, be made accessible within the institutions. The hospital environment should not only be satisfactory from a medical point of view, but it should also be intellectually and emotionally stimulating. This is especially important in long-stay institutions. The hospital library's central place in the cultural activities provided in the medical care sector is emphasized, plus the fact that a well-functioning library service is necessary in order

to reach a satisfactory cultural level – for both patients and personnel. Ever since the 1920's the Swedish hospital libraries have also served as staff libraries for all employees. It is evident that this positive view of the hospital libraries' activities pervades the various studies which have influenced the development of hospital libraries in Sweden during the course of the last three decades. This has meant that Swedish hospital libraries have developed into libraries where all categories of health care workers as well as patients are welcome and this has had positive effects for medical library activities as a whole. The integrated hospital libraries have striven to make themselves available to all personnel categories, not just physicians, though that is of course a very important target group for medical library activities. Patients and patients' families are also welcome to consult the more accessible literature in the medical part of the integrated libraries.

Today Swedish hospital libraries are flourishing, their broad activity field ranging from story-times for children to computer-based literature searches. The medical library sector functioned so responsively that in 1989 it accounted for 26% of the total Swedish usage of the Medlars databases at MIC, Karolinska Institute Library and Information Center, compared with the pharmaceutical industry, 22%, and the university libraries, 16%, (Measured in SEK). Thus in 1988 the hospital libraries were the biggest user group of Medlars-at-MIC. At present over half of the 250 largest hospital libraries in Sweden are integrated while regional medical library activities exist in 6 or 7 counties only.

There are still no more than about ten genuine medical libraries, run by trained librarians. Hospitals with neither an integrated nor a purely medical library do not have access to a professionally run library, but only organized book collections in clinics and departments.

In counties that have integrated hospital libraries and a regional medical library administration, the hospital library service is usually of a very high standard.

For example: all the libraries at the 22 hospitals and nursing homes in the county of Värmland are integrated hospital libraries with both general and medical stock and services. As regards the general library activities all the libraries offer the same services to patients and staff – weekly book trolley rounds, book-lending services, talking books, music tapes, tape recorders, programmes, exhibitions, etc. At 17 of the libraries there is also an art collection activity that up to now aims mainly at the long-stay patients. All hospitals and nursing homes have specially employed readers who read to individuals or small groups of long-stay patients. The regional hospital library in Karlstad also has special reading hours for children and children's art collection. Thanks to the central hospital's library serving as the regional medical library for the whole county council area, the libraries can also offer an excellent specialized medical library service. Värmland County Council is the principal for the hospital library activities within the county. The regional hospital library in Karlstad is run directly by the county council while all other hospital libraries in the county are run by the local authorities on behalf of the county council.

The primary objective of hospital medical library activities in the county of Värmland is to provide – through the libraries of the hospitals and nursing homes in the county – all health services employees with access to the professional literature they require, for their jobs, their own professional development and research in connection with the activities of the county health services. Patients' needs for medical literature should also be respected. The library of Karlstad Central Hospital is a resource center for the whole county (population: c. 250,000) and as such it provides support – as far as time and facilities allow – in the form of book loans and literature searches, to other libraries in the county, e.g. municipal libraries, university and college libraries, company libraries; as well as individual students, organizations for the handicapped, etc.

In general, this objective has been fulfilled: via the libraries of the hospitals and nursing

homes, the county has maintained a uniform level of medical library service to health care workers throughout the county. The media resources have proved sufficient to provide all health care workers in the county with access to the medical literature they require, to carry out their work and any research activities in connection with the county health services they may undertake.

The library of the Karlstad Central Hospital is responsible for the acquisition, registration and distribution of medical and other literature pertaining to the field of health care and for literature searching, loans, information, contact with patrons, providing advice and support to all personnel categories and libraries connected with in-patient and out-patient care. The library of Karlstad Central Hospital has gradually acquired a pivotal role within the country, through its medical department. The library staff tries to help other libraries, where possible, and individual students, etc., with loans and literature searches.

Besides the central hospital, there are four smaller county hospitals as well as some 15 nursing homes. The integrated hospital libraries at these 21 hospitals are responsible for any supplementary maintenance of the local medical libraries that may be required. This includes registering and distributing new books and periodicals, etc., within the hospital or nursing home; furthering suggestions for acquisitions and loans; passing on search queries to the Karlstad hospital library. At two of these smaller county hospitals, the libraries perform their own data searches on their own terminal.

All personnel categories in out-patient services – district physicians, district nurses, staff of children's medical centers and maternity care centers, and other out-patient units can either contact the hospital library in Karlstad directly, or go through their nearest hospital or nursing home library, for help in finding information. For these personnel categories, every out-patient unit has its own collection of relevant reference literature and periodicals. The hospital library in Karlstad also organizes an extensive program of circulation of medical journals to personnel in the out-patient services.

Centralization of book acquisitions and journal subscriptions has resulted in more rational organization. For instance, the implementation of a central catalogue has meant that stocks of books and journals are used more effectively. Where loans and literature searching are concerned, the Karlstad hospital library has accumulated the expertise that can enable it to provide, in co-operation with other, smaller hospital libraries in the country, effective and fast service to borrowers in the health and medical services of the county.

It is very likely that within the next few years the administrative routines of the library will become computerized, as is the case at several other Swedish hospital libraries. This will undoubtedly result in further gains in effectivity, and improved library service.

During the current year the county council in the county of Värmland is investing 5 million SEK in general library work and 3 million in the medical library activities in the county council area – this, in a county with 280,000 inhabitants and barely 4,000 beds.

Hospital libraries in the county of Värmland are in many ways typical of Swedish hospital libraries and all the activities and services that are offered exist in many other Swedish hospital libraries. The picture, however, is not as bright in all counties.

As in most countries, during the past decade all types of libraries in Sweden have suffered severe reductions in their activities and media purchases. Hospital libraries have done well, however. This can be ascribed to the fact that they have managed to fulfil the library and literature needs of patients and personnel alike within the Swedish medical care sector rationally and economically. Swedish hospital libraries – not least the integrated ones – anticipate being able to broaden and develop their activities in the future.

Automation at Landspitalinn Medical Library

Solveig Thorsteinsdottir
Head Librarian, Landspitalinn Medical Library,
Reykjavik, Iceland

Abstract
Landspitalinn Medical Library and other libraries in Reykjavik tested four different library automation systems. The system that was chosen by the testing group was IBM's Dortmund and Leuven Library system known as DOBIS/LIBIS. The selection was based on the following: 1) All library functions had been developed and tested; 2) The system is organised as a network; 3) The system has the ability to handle a great number of volumes; 4) It works with one set of data all available online; 5) It is improved on a regular basis based on users' suggestions; 6) It is used in many libraries in the world; 7) It runs on hardware which is available in Iceland. From the testing group two libraries are now using DOBIS/LIBIS – The Reykjavik City Library and the Landspitalinn Medical Library. These two different types of libraries share the same bibliographic data with few difficulties although the libraries have to agree on rules for how to input data into the system. Landspitalinn Medical Library began to use this year. The library has so far successfully used the cataloging facility. The plan is to make full use of the system by the middle of next year.

Since the beginning of 1990, Landspitalinn Medical Library has been using the IBM Dortmund and Leuven library system known as DOBIS/LIBIS. The system is operated by the Icelandic State and Municipal Data Processing Centre (SKYRR). It is used jointly by Landspitalinn and the Reykjavik city library, Borgarbokasafnid. Landspitalinn is the National Hospital of Iceland. The Landspitalinn library serves both the hospital and the health science students from the University of Iceland. It is a small library by international standards. The library subscribes to 666 journals and includes a book collection of 6,000 titles. The staff consists of six librarians and two library assistants. One might wonder how we have managed to obtain such an automatic system for such a small library.

At the present time, in all of Iceland there are about 200 public libraries and over 40 research and other special libraries. Since there is no statutory national library system, cooperation between libraries is voluntary, and depends upon the individual libraries' interest. In 1980, there was intense interest among the librarians to automate their libraries and select a common computer system. In 1981, a committee – "Tölvunefnd bokasfna" – was formed to look into the matter. The committee produced a proposal to select a system to be used for one integrated bibliographic database that could be shared by different types of libraries and that would meet all their different needs. The proposal stipulated that the database be accessible from any location in Iceland and that the system would be able to handle all library functions. This proposal was realistic considering that the size of the collection of each of the libraries in question is rather small. Libraries in Iceland are smaller and fewer than in most countries. The population of the country is only 245,000 and half of the people live in the capital city, Reykjavik. The production of books in Iceland during the last 100 years amounts to some 40,000 titles. The proposal also contained other requirements for the operation of the system.

Systems were selected for testing by librarians from different libraries. Four systems were

tested and one of them was DOBIS/LIBIS. The system was set up to be tested in May 1986 at SKYRR. SKYRR runs a number of computerized databases that are searchable online from all parts of Iceland, e.g. the Icelandic Lawbook and the National Register. Five different libraries took part in the test. Among them were the University Library, the National Library, the City Library of Reykjavik and Landspitalinn, the National Hospital Library.

A majority of the testing group chose DOBIS/LIBIS over the other systems. DOBIS/-LIBIS met most of the requirements set up by the committee and in several aspects it was clearly superior: 1) All library functions had been developed and tested; 2) DOBIS/LIBIS is created as a network and can be used by many different libraries without their interfering with one another. Each library in the system has its own circulation, funds, etc. Even a branch library within a system library could have its functions separate; 3) The system can handle a great number of volumes; 4) It works with one set of data which are all available online; 5) It is improved on a regular basis based on users' suggestions. There is a large user group which meets once a year. Each library also has the right to change the system to fit its needs; 6) The system is also used by many libraries throughout the world, for instance, large libraries such as Oxford and Liverpool University Libraries in the U.K.; 7) It is run on hardware which is available in Iceland.

Although the majority of the committee had chosen DOBIS/LIBIS, all the libraries were not ready to make a decision to choose the system. The first one to choose the system was the City Library, Borgarbokasafnid. In 1989, the city of Reykjavik bought the system. SKYRR maintained it, as it had done for the test. The DOBIS/LIBIS system is run on an IBM 4381 computer which is going to be replaced this summer with an IBM 3090-200 J computer. The operative system used is MVS. The data processing staff consists of three computer scientists – one from IBM and two from SKYRR. The new "Version 2.1.1" of DOBIS/LIBIS was installed in January 1990. Such revised versions appear at regular intervals. In 1989, the Landspitalinn Library joined the City Library as a user of the DOBIS/LIBIS system.

General features of DOBIS/LIBIS

Although this presentation is intended to describe the system in operation at the Landspitalinn Medical Library, som description of the system itself is necessary.

DOBIS/LIBIS is an integrated librarys system, which means that all functions of the system – searching, public access, acquisitions, cataloging, circulation, periodicals control and abstracts – work with one set of data all available online. Data is entered only once and stored in authority files for later use in creating the catalog, acquisition, circulation and periodicals records. These records are re-used when additional copies of a document are needed. This eliminates duplications. Both library staff and users can access information through the indexes. DOBIS/LIBIS is multi-lingual and MARC -compatible. It is suitable for many types of library environments. It can be used in a single library or in a network of libraries.

DOBIS/LIBIS consists of a set of programs that together cover all library functions, i.e.:

1. Online searching and public access
2. Online cataloging and developing abstracts
3. Online circulation
4. Online acquisition
5. Online periodical control
6. Catalog and report production
7. Production of management statistics
8. Online mail

1. Online searching and public access

System menus

The user selects an item from a display menu. There are many options to choose from. Each function in the system has its own menu. If the user is in the process of searching for example, he can choose name, title, subject, ISBN number or publisher. After he has indicated his choice, by using the numbers on the menu, e.g. a subject, the system responds with an empty field for the user to type in the subject. The system then responds with an alphabetical index where the user again selects the subject.

Command chains

The command chains are designed for the experienced user. The user can go through as many menu/function levels as required without having to view the intermediate screens. These command chains can also be used to move from one function of the system to another, e.g. from circulation to periodicals. The user types in "//peri" and enters the periodical function.

The program has Boolean search operatos, KWIC indexes, truncated searching and quick-searching. The system also has a special online public access catalogue, LIBIS (OPAC). The library user can search with words from personal and corporate names, titles, subjects, abstracts, publishers and ISSN or ISBN numbers. He can also use Boolean operations and limitation of search results, by date, type of material, location and circulation status. He can browse through the records and search using truncated search terms. He may browse freely backwards and forwards through the index and use command chaining with a new search term to jump to another part of the index. He can also select quick search, which is a single-screen operation where the user has to fill in a search form. The system then carries out the necessary searches and Boolean combinations to complete the search.

2. Online cataloging and abstracts

Cataloging is chosen from the main function screen. There are three sorts of data entered and stored in the catalog record: codes, authority, and free text. Records are entered and changed online. Abstracts in different languages can also be entered, updated and searched online. The cataloging can be done either from scratch if there is no existing record in the system, or by copying a record already in the system. This record can be found either in the DOBIS catalog or in the DOBIS bibliographic pool. The system allows for downloading from other systems to the bibliograhic pool. If the cataloging is done from scratch, frequent entries for names, publisher or subject headings can be selected from the authority files. This saves a lot of work and also makes sure that the same name is not used several times in the system with a different spelling or form of a name. If an entry needs to be changed in the system it can be changed all at the same time. If a MeSH heading needs to be changed it is done only once for all the entries attached to that heading.

3. Online circulation

The status of the loan is displayed when the bibliographic index and the borrower name or number are searched. The material is charged out or checked in online. Each library sets its own loan policies, fines, overdues, hours of opening and closing dates. Holds can be placed on any or all copies of a title. Overdue notices can be generated.

4. Online acquisition

Orders are entered, and items and invoices are received online. A claim policy set for each library regulates the timing of claims for overdue orders. Acquisition status is easily accessed by vendor, library fund and bibliographic index. Prices in foreign currencies are converted to the local currency. Subscriptions and renewals are managed automatically.

5. Online periodical control

The periodical functions are selected from the main menu. It contains three major functions: the online receipt, claiming and binding of periodical issues, online entry and maintenance of full text (abstracts), and a batch program for statistical analysis of management information.

The key to the periodical function is the prediction pattern, which keeps track of the issues expected for each periodical title held in the library. A prediction pattern can only be created once a bibliographic record has been created. This is done in the cataloging function. When the issue arrives at the library, a quick title search is performed. When the display comes up, the letter y is pressed and issue has been checked in. If it does not arrive, there is a special function for treating a missing copy. Claims for missing and late issues are sent on the basis of a locally defined claiming policy.

6. Cataloging and report production

Using batch programs the system can also produce printed and COM catalogs, catalog cards and accession lists for all or part of the network in SIBDL (International Standard Bibliographic Description) format. The format and contents of notices such as overdues, orders and claims are specified independently for each library in the network.

7. Production of management statistics

Statistical information is extracted, analysed and printed in library-controlled formats.

8. Online mail

The library staff can send messages to all other users on the network who have a user ID. The user can send messages to the library staff, e.g. requests for photocopies from the library.

Security

The system has built in security. Library staff must give their correct name and password to logon. Multiple-user authorisation levels control access to sub-functions. The library user can search online but cannot make any changes or see classified information.

Existing automation at Landspitalinn Medical Library

Online searching has been done at the library since 1981. Interlibrary loan through Nordic Serials Online (NORDSER) has been done since 1983. Macintosh and PC are used for searching. The library also has MEDLINE and CHINAL ON CD-ROM since the beginning of this year. Macintosh and PC have been used for many tasks at the library such as the list of periodical holdings, accession list for new books, address labels, reports and letters.

Why DOBIS/LIBIS?

It does not matter how big the library is; the same functions need to be performed in all libraries. DOBIS is a system which handles most library functions effectively.

Landspitalinn got access to this large system without great expense. The Icelandic medical libraries have a long tradition of sharing their collections. Now that we have chosen DOBIS it is easy for other libraries to access. By sharing the system with the biggest public library in Iceland we get the benefit of their knowledge of the system. We hope that a bigger library will help us to provide better service.

One of our prime reasons for choosing the system, besides the points mentioned earlier and the points made by the testing group, was the capability of the system to handle serial control. In most systems, the periodical part has been the most difficult to design and very few systems have a good periodical control. DOBIS is well ahead in that aspect. I tested the periodical part especially and once I managed to get a grip on how to set up the periodicals

prediction patterns, it all went smoothly. I also visited the IBM library in the Boehringer Laboratory in Germany, where the periodical control had been in operation for some time and it worked well there.

Other reasons were the capacity to develop and retain abstracts. None of the Icelandic medical journals are indexed anywhere. The librarians at the medical libraries in Iceland have indexed them on cards for use in the library. The Medical Society of Iceland gave me the task of indexing the Icelandic medical literature. The task is now partly accomplished. I used a PC to do it and that meant an enormous amount of work, so we plan to go over to using DOBIS for the indexing of Icelandic literature. Everything else is accessible in other foreign indexes. For indexing we have used MeSH terms in English. We expect to continue doing that because it is too expensive to have MeSH translated into Icelandic. However, there are still people in Iceland who don't understand English that well, so we plan to append an Icelandic abstract to each record. The abstract is searchable by text-word searching.

Another reason I would like to mention is that the system is manufactured by a strong company which is unlikely to go out of business.

Implementation of the system

The agreement between SKYRR and Landspitalinn was done at the end of December 1989. The system had been in use during the testing period in the library since 1986. During that period most of the books had been entered into the system. Records older than 1986 had been bought from an external source and loaded into DOBIS. The bibliographic data had been bought from MARCIVE in the US. The records were in LCMARC and had to be converted to DMARC. Software from IBM was used to do the conversion. It did not convert the NLM classification and also there were problems due to the Icelandic character set. We had to make corrections after the bibliographic data had been loaded. It was loaded on to the bibliographic pool. All records later than 1986 have been entered from scratch. The cataloger at our library now has a thorough knowledge of the cataloging system. After only a few hours of training, provided by the cataloger at the City Library, she was able to use the system to catalogue. It took some time until she could utilize the system fully and use command chaining. It now takes her only a few minutes to catalog an ordinary book. The two libraries sharing the system have to agree to use the same rules for cataloging. It has worked well though some classification rules have had to be changed in both libraries in order to reach a common set of rules. The libraries use different classification systems, Dewey and NLM, but that does not create problems. If both libraries own the same book the record for the book shows the two different classification numbers one after another. It does not confuse the user since the systems' number-and-letter combination look so different.

At this writing, five months prior to the conference, the circulation function is about to be implemented. The plan is to start in the beginning of May. We do not circulate our journal collection so the circulation is not unnecessarily slow. We can therefore add the library user record to the system when the user uses the system for the first time. We also use the user file to input the account number for each user, which saves the library staff the time and trouble of having to look up all these numbers manually. These account numbers have to be used all the time since the service of the library have to be charged to the user's department at the hospital. The books are also barcoded as they are loaned out. Our library does not have much experience so far with the circulation function, but it appears to be quite straightforward. The City Library has been using it for some time now and is satisfied.

The bibliographic records for the serials will be added by buying in records from external sources. The records of the serial holdings from Icelandic medical libraries are bought from NOSP and loaded onto the system. We plan to add the prediction patterns as the issues arrive

at the library starting in September. Since some journals are only put out twice a year the whole collection should be in by early March 1991.

The indexing of the Icelandic medical journals will start with the first issues for 1991. We also plan to index articles of medical interest from Icelandic newspapers. Icelandic newspapers are not indexed, but often publish good articles by Icelandic health professionals that are of interest to students and patients who use our library.

As of now the plan is to start using LIBIS in May with one terminal in the library. We are also planning to install terminals at various locations in the hospital to make it easier for users to access our collection. The system was introduced to the library users in a newsletter from the library. In April we held a Special Education Day where the hospital and the library staff gave a presentation of DOBIS/LIBIS. Most of the training in LIBIS is included in the library orientation program for new hospital staff and in courses held for medical and nursing students. LIBIS is easy to learn and the quick-search facility brings it within the reach of any user.

The training of the library staff has been on an individual basis. During the test period of DOBIS/LIBIS there was a three-day course at SKYRR taught by an instructor from the University Library in Leuven, Belgium. I visited the Leuven University Library and observed the system in use. I also spent one day at the IBM Library at Bublingen in the FRG and learned how to use the periodical function. The people who took part in the testing of the system have also travelled outside of Iceland to study the system and each one has been able to make a valuable contribution of his experiences and impressions from libraries abroad. The City Library staff has also translated most parts of the system into Icelandic. It is a joint effort and our library staff has initiated the translation of the periodicals. Our user can now use English, German and Icelandic versions.

Besides the translation only a few other changes have been made. It is better not to change our copy more than absolutely necessary as this makes it easier to incorporate the new versions of the system as they are released. Among the other changes that have been made can be mentioned the following: names in Icelandic have been adopted to the Icelandic name tradition, i.e., the given name comes first, then a middle name followed by the patronymic, e.g. Jon Gunnar Jonsson; extra formheadings have been added which appear in the short information display in brackets, e.g.: Does it hurt? (video); items such as producer, and so on, have been appended to the statement of responsibility; long titles can be moved sideways both to the left and the right; special information pertaining to the main entry has been added. This information is accessible with the letter M or D; in the acquisition, the latest order appears first instead of in alphabetic order. Besides these changes, we are also able to connect to a LBSPC system which can be used as a backup if circulation in the system is down. When the system is up again, all the information is entered back into the system by simply pressing one key. The LBSP system can also be used for downloading data, production of barcodes and booklabels.

Future plans

DOBIS/LIBIS is in its early stages at our library. We hope that other medical libraries in Iceland will join the system to make a network of medical libraries. The success of the system so far gives promise for future development. The next stage for our library is to extend our use of the system and its facilities. In the future the users of the system will be able to connect with each other in different countries in a global network. For medical libraries in Iceland this will open a new door to the world of medical books and writing.

Success Factors in transforming a traditional Medical Library into an Information Center, for the Future

Elisabeth Buntz
Medical Library and Information Center Rikshospitalet Oslo, Norway

Abstract
Information technology makes it possible to access internal and external information sources from any location. Every PC is a potential gateway to the world of information. Librarians have to take part in the organizing of information as well as in the traditional role of searching and retrieving information. We must take on more of a teaching role in the searching of databases and be knowledgeable about hardware and data communication questions as well as about command language. Medical libraries can make valuable contributions to better information services for patients by making patient information databases available.

A good understanding of management techniques and an effective use of human network resources will help in ensuring an interesting future for medical libraries.

The challenge continues.
The challenge changes.

Introduction
I was asked to give the same talk to this conference as I did to the 2nd Nordic Conference for Medical Librarians here in Stockholm in 1988: "Medical Libraries and Computer Departments – Competition and Cooperation." The challenge at that time, and some years prior to that, was how to survive and succeed in the midst of Computer Departments and emerging Centers for Medical Informatics etc., filled with powerful men who thought libraries were for the lending of books and everything to do with information out of computers for them.

The librarians who did not meet the computer challenge of the eighties are perhaps no longer with us, and for those of us who survived the struggle, we are still struggling, but it has become a bit of a non-issue. At least is how I feel. The nineties are here with new and exciting challenges.

Information sources and technology: decentralized use and integration
The development towards decentralized access to information sources, and at the same time a move towards integration of information sources, I see as two aspects of the same trend.

Overall implications for librarians:
The decentralized aspect of information technology is rapidly and drastically changing our working environment. I am convinced that it is through local access to information that the much talked-of information revolution will become a reality. (N. McLean, IFLA, 1988)

1. It is necessary for librarians to *find out how our customers conduct their work*, so that we can find out how best to give our services.
2. It is necessary for librarians to *take an interest in the organization of information*, not just the retrieval of information.
3. Librarians must *participate in computer network planning*, in order to secure the necessary priority for library services.

Operational implications:

Proficiency in searching. We must take our qualifications as searchers very seriously. We will be found out or we will be admired and thanked. Don't let anybody catch us with our pants down when it comes to searching medical databases.

Educational role. We will have more of a consultative role in searching. We will not be given that role, it is ours if we are professionals. Keep track of the endless alterations and news for databases of interest to your customers. Train people in searching through courses and demonstrations.

Be computer literate. It is more important to your customers that you have knowledge in computer communication protocols rather than in cataloging rules. It is important to be able to give advice on everything to do with searching, not just on command language. Your customers are able to read.

Study your customers. What are their information seeking habits? What kind of personal literature files? How are manuscripts prepared? Personally I would conduct that kind of study "invisibly" by talking to people in the library and by visiting doctors in their laboratories on some pretext. A more systematic approach is probably called for.

The library must be a showcase. You simply must have the latest fashion in information products available for your customers to use on a regular basis or to try out. Whatever may be of interest in your institution. Use your imagination! Make it easy for your customers to order the products you promote.

Networks. It is of paramount importance that the library is connected to the hospital computer network or that the hospital network plans include the library. When deciding on buying a LAN (Local Area Network) the most important consideration is to *find a knowledgeable dealer* to do business with. Nothing is more important for success than dealing with capable people.

Our LAN had to be tailor-made for *all known data communication* modes almost, not the least of which was to communicate intelligently with Medline, etc. Plus of course being able to handle a variety of operating systems.

You must be able to link up the 9th PC without having to make an entirely new investment. And you will want the 9th and more terminal. Don't think you don't just because you have a small library!

Get access from your library-LAN to whatever *institutional resources are available,* and give access to *library resources from the departments.*

Service to "new" user groups through integration. The scientific literature is well indexed and easily accessible, relatively speaking. Scientists are used to libraries, and are generally able to obtain the literature they need.

Who in our hospitals do not receive and adequate information service? And what kind of useful literature is poorly indexed and difficult to get hold of in our hospitals?

Patient information

Norwegian health personnel are continually being criticized for not giving adequate information to their patients.

Our library will create and make available databases which can *support health personnel in their patient information work.* The databases will contain information on patient associations, audiovisual material and literature.

In the situation of discharging a patient, I would like to see health pe... ...e patient information from the library database, accompanied by an invitation to use the medical library. An entire Medline search could be conducted and given to the patient should the patient or health worker find it useful.

Hopefully when patients understand that it is possible to get to the bottom of all information easily through the hospital, that will help to keep lawyers away from the hospital. The benefits to the patients themselves are more obvious. This effort will be in step with the consumer movement and a useful contribution from the library.

Material: inhouse produced publications

One very obvious task for medical librarians to do, which would also help in the patient information work, is to index all kinds of documents, videos, films, etc., produced by various hospital departments and not available in national or international databases.

Open public access catalogues

Are they accessible in a form which suits health personnel? Could we make it possible in the future to browse the contents pages of the registered books? Better subject access is certainly needed. Our cataloging rules and practices were meant to serve a different purpose than that of public access catalogues.

Management

Human networks (your colleagues)
Service management (your customers)
Visions and missions (your superiors)
Business aspects (your money)
Marketing aspects (your success)

Human networks

The human network is a powerful tool for success. None of us exploits that valuable resource to the full. There are enormous amounts of knowledge and advice available just for the asking. Another aspect is that close cooperation among librarians through associations and groups makes us united and strong as a profession, from which we will all benefit.

It is important that we as individual librarians build up and look after our human network, our personal consultancy. And it is important that we as a body build up and look after our professional network. The stronger we are as a group, the less we will be troubled by power-games from others.

Service management

We work in the service sector, not in production industry. Even so, whether or not we charge for services, we are selling and marketing the whole time in our contact with people, in the very way we conduct ourselves and our business. Oscar Wilde said that only superficial people don't judge by appearances. We are on a stage. We ought to pay attention to how we look and to the things we surround ourselves with. It all adds up when customers are forming an opinion about library service.

The way we treat each other, the "atmosphere" amongst the library staff will also influence our customers. It is not enough to be nice to customers, we must be nice to each other. The vibrations will reach out to the audience so to speak.

Internal marketing of ideas, the message, services, the image, it all has to be sold to your staff first. What you can't sell to your staff, you certainly cannot sell to your customers. The internal marketing of ideas and patterns of reactions in very important! Discuss everything, agree on a strategy in major as well as minor issues. You are "the library". Don't give any contradictory signals when dealing with your customers. Best Japanese industrial philosophy this!

Customer participation is important in all service work. Win your customers over to your team and let them be part of your resources, your workforce. The library belongs to them, and they will work to keep and improve it if you have succeeded in getting them on your side. As librarians we exist only as long as our customers find our services useful and pleasant. There are alternatives. We do have competition!

Are the conditions for our customers good enough? For every service, analyse what part we expect the customers to play. Let us think through the various routines and ask ourselves: are our forms and instructions clear enough, do the customers use an unnecessary amount of time on certain tasks, etc. Try out your own library, play the customer, or get somebody you know well to do so. Find out how it feels.

Visions and missions

Efficient service on a daily basis is necessary but not enough. *To have a vision is essential*, an overall intention, an overall plan. We must know in which direction we are going. If we know what we want, that in itself is a powerful tool in making it happen. Make life easy on your hospital president. Take control over library matters, be responsible and communicate clearly what you want.

What is true of visions, is also true of missions, as I call the different projects we work on. For some years the computerization of the library was the major mission. The computerization efforts continue, but other projects occupy our minds. Information from the library for use locally and information to patients are examples.

Don't try and do everything at once. If you aim at everything you hit nothing. And don't expect any support before you have proved yourself. Get at least a very small success story together and work from there.

Know what you want, communicate your message clearly, and you will make it happen despite all kinds of obstacles, lack of personnel, lack of funds, etc. *The main obstacle in achieving anything or in making changes is yourself.* Most restrictions you feel, even in the public health sector, are self-inflicted.

Business aspects

Money is a powerful tool for achieving your goals, for having success. A part of our library at Rikshospitalet is run like a "business". Our basic services are free for everyone connected with our hospital, but we can use the hospital facilities and our own private time for money-making activities. The only condition is that we give 10% of our gross turnover to the hospital research organization.

I recommend striving for some financial independence. It gives you flexibility to travel and find out what's going on. You can be at the right place at the right time more easily. It will give you more funds from regular sources as well. The Matthew principle applies: when you have something, you will be given more.

Marketing

The most important promotional activity in a library is simply giving good service, and our most important allies are our customers. They will work effectively for our budgets and our general success given the right conditions. *So looking on the bright side; people come to the library*, we get an opportunity every day to show what our libraries can do. It is a great advantage we have over most other departments whose work is not so visible. To be seen is a powerful tool in achieving success! We are free to arrange all kinds of promotional activities in our libraries: talks, courses, demonstrations, receptions, whatever.

Ending note

Let us have a high opinion of ourselves and our work and communicate our enthusiasm and our value to everybody we come into contact with. After all, what can be more important than organizing and retrieving information? Let's conquer the world!

The Iceberg of Crumbling Books: Conservation and related activities in Norway

Rolf Dahlø
National Office for Research and Special Libraries, Oslo, Norway

Abstract

The paper reviews the condition of books in Scandinavian libraries in comparison to other libraries. A cold climate in the stacks has delayed the degradation of paper. Few conservators work in the Norwegian libraries, and much of the conservation effort will be concentrated in the development of a new national library as a servicepoint for other libraries. Legal deposit will according to a new act be extended to all published documents in new media as well as paper documents. Archival copies of paper documents will be stored at a low temperature preserving the documents for a prolonged period.

Promotion of permanent paper has been fairly successful in Norway. The visual symbols of the ideas behind this promotion may be copied in other countries. Copyright drawings from Norway may be used freely for the non-commercial promotion of permanent paper.

Norway has perticipated in establishing an international standard for permanent paper. The author urges all librarians to support the activities of the ISO/TC 46/SC 10 "Physical Keeping of Documents" establishing international standards within the scope of this committee.

Small libraries without conservation resources ought to improve their housekeeping routines in order to keep their collections in a better condition.

The Scandinavian libraries may in many ways seem to have been protected against the most immediate effects of the modern, self-destructive types of paper. The main reason for this is simply the Scandinavian climate. Library stacks have as a rule been cool rooms with a low humidity and without unwanted biological activity destroying our intellectual heritage. These stable conditions have delayed the destruction of books, periodicals and other records.

For a rapid degradation of paper there must be some energy and some humidity present. The destructive properties of papers are released faster when the temerature is high, and when there is enough humidity surrounding the paper. The cold climate may be severe for people, but it has been rather beneficial for our records on paper. It does not, however, mean that we can avoid the harmful effects of modern paper.

In Scandinavian libraries one will of course find some sad examples of crumblong paper, especially newsprint. But the extent of the destruction of our records can't be compared with the disaster one will already find in many libraries in warmer or tropical climates where the heat and water vapour has speeded up the internal destruction of the records on paper.

When the reports started to come from American libraries where a large portion of the holdings were too enfeebled to be issued for ordinary use, many people in Norway thought that the seemingly stable condition of books and other records indicated that the alarm signals from some Norwegian librarians were somewhat exaggerated, because it was hard to find examples of other types of paper than newsprint crumbling to dust when it was touched.

But the degradation of paper is a chemical process, and chemistry knows no boundaries. You will understand that the difference in climates was the cause when it was difficult to observe many extreme examples of paper degradation in my country. Thanks to comparative

work done by Ivar Hoel on identical editions in Nordic libraries and in The Library of Congress in Washington D.C. we have learnt that degradation of paper in our libraries will require about 30 more years before we have reached the alarming condition that is already present in The Library of Congress.

In recent years Norwegian librarians have started to realise the alarming character of the conservation needs of their collections. It is like the proverbial tip of an iceberg. Only one-seventh of the total mass can be seen above water as an indication of the impending danger. The problem is bound to become critical even in our libraries. A favourable climate has only given us a respite of a couple of decades which we may use to prepare ourselves.

Even in countries with extensive programs for conservation many, of the responsible leaders of preservation work present their efforts regretting the inadequacy of the measures compared with the rapid decay of library materials. In our country the process of increasing the funds for conservation and preservation programs have just started.

In the Norwegian libraries we have until now had only two qualified paper conservators working, and those two can not do much of the conservation effort that ought to be done. Disagreement between conservators in the museums on the approach to training has made it difficult to establish a school for conservators in Norway, but we do hope that recent initiatives will make it possible to start the training of conservators for archives and libraries in Oslo.

Since the 19th century the University Library of Oslo has been functioning as the national library of Norway. Last year the Norwegian parliament decided that a department of a separate national library should be established in the Northern part of Norway. This separate national library that we now plan the outlines of, will be based on the present knowledge of our needs for conservation as an organic principle. We do hope that the Norwegian parliament will establish the complete organisation of a new national library in 1991.

On the basis of a new act of parliament there will be legal deposit of all published documents regardless of media as well as printed material. The national library will receive films, videotapes, sound-records, broadcasting programmes, television programmes, digital documents, everything that is made available for the public or distributed in more than 200 copies in any organisation. This new responsibility for the national library will give us new resources for conservation, and we have accepted that the national library must act as a central service-point for conservation of all collections that supplement our national, cultural heritage.

From October 1989 we have established a department for microfilming and restoration of photographic material. Two new paper conservators are being trained in Denmark for preservation work in the new national library. We are also planning further departments for the conservation and preservation of all new media containing analog or digital information.

Special consideration will be given to a complete separation of archival and lending copies of material. The new media give us a lot of new problems, but paperbased documents may be easier to handle. We will store archival papercopies in a mountain hall, and by using the natural properties of the environment it will be fairly economical to provide a stable atmosphere with a low temperature at about 7 centigrades and low humidity. The mountain itself will keep that stable temperature without any further energy being used, and all we need to supplement is some energy to modify the humidity to the level we want. This kind of storage is simply a very cheap solution for keeping paperbased documents for a longer period.

We have not started any planning for massconservation. We think that a plan for massconservation will be premature in a small country. Only one process for massdeacidification is yet commercially available as an alternative to expensive, timeconsuming conservation work. Massdeacidification seems to be an alternative mainly for preventing the decomposition of

contemporary books, and there is still no process which is totally uncontroversial. Massconservation with an increase of strength in brittle paper is yet a process in research, and we think that it is worth waiting for the British process of polymer grafting being made available for the libraries.

While we wait for an adequate massconservation process such as the process being developed by the British Library to diminish the threatening iceberg of future conservation needs, the invisible basis of this iceberg is growing each year at the rate of nearly one year's acquisitions. What can we do to frustrate this growth?

It is surprising that even countries with more or less adequate programs for preservation make only irresolute efforts to avert future needs for conservation of library materials. The promotion of permanent paper ought to be an integrated part of a strategy for preserving our cultural heritage. Compared to other elements of a preservation program the efforts for increased production and use of permanent paper will be cost-effective.

The Norwegian National Office for Research and Special Libraries has run a modest program for promotion of permanent paper since 1986. The effect has been an increased public awareness of the problem of brittle paper, improvements of the printing-paper produced in Norway and more adequate information about the storage capability of imported paper. As a direct result of this program the biggest book publisher in Norway has started to use permanent paper in all their books. It is hoped that information given to book designers will result in an increased number of books produced on permanent paper.

Some elements of this Norwegian program for promotion of permanent paper may inspire other libraries to new efforts for decreasing the growth of contemporary material with a potential for future decomposition. In some countries the promotion of permanent paper has been oriented mainly towards the publishers. The practical results, however, will be small if this effort is not supplemented with a program for public awareness of the problems of brittle paper.

The modernisation of paper industry and new standards for the conservation of the environment make the paper industry an ally for the libraries. People in the paper industry have normally adequate knowledge about the properties of permanent paper, and there is a clear reorientation from the use of acid sizing towards neutral or alkaline sizing of the paper. The case for permanent paper has been one of the elements for improving the operational efficiency of Norwegian and Nordic paper plants. The Norwegian paper trade has been an invaluable partner in the work done by the Norwegian National Office.

Information can never appeal only to the human intellect. Words will not always be an adequate vehicle of an idea. Much work has therefore been applied to the development of visual symbols of permanent paper. In its program for permanent paper the National Office has used a drawing of a hedgehog. The obvious symbolism is a friendly animal which might bristle with its quills whenever it is provoked. In many countries this animal is one of the species threatened with extinction, and the concern for a threatened species will not exclude the concern for crumbling books.

The Norwegian artist *Hans Normann Dahl*, who made the charming drawing of a female hedgehog for the children's book "Sirkus Mikkelikski" by *Alf Prøysen* (Oslo, 1963), kindly consented that his copyright drawing could be used for non-commercial promotion of permanent paper and supplemented the original, smiling drawing of "Bolla Pinnsvín", the modest heroine of the story, with a hedgehog expressing a protest against acid books destroying the future of all literary being. For a literary being living within the pages of an acid book crumbling paper is of course an existential problem.

This symbol was presented at the Norwegian Book Fair in 1988. The smiling hedgehog

illustrates the positive properties of permanent paper, and the unhappy hedgehog is picketing against acid books. We used two slogans: YES TO PERMANENT PAPER! and NO TO ACID BOOKS! Handouts were a pamphlet about permanent paper, the text of the American National Standard Z39.48–1984 and a collection of paper samples from Danish, Norwegian and Swedish paper producers with a minimun pH of 7.5 and a minimum alkaline reserve equivalent to 2 % calcium carbonate, containing no mechanical or unbleached chemical pulp. Very popular for people from 3 up to 90 years was a button with the smiling hedgehog and the slogan NO TO ACID BOOKS!

The Norwegian word "sur" means unfriendly and surly as well as acid, and some Norwegian novelists were afraid that this was some kind of protest against their books. At the Norwegian Boook Fair in 1989 we therefore used the slogan YES TO LASTING BOOKS! (JA TIL BØKER SOM HOLDER!). We do hope that this slogan is more flattering for the fortunate authors who will see their books presented as examples of publications on permanent paper. And we have started to present on behalf of Bolla Pinnsvin a special honourary prize to people in the book trade who have done good efforts using permanent paper. The results of the Norwegian program for promoting permanent paper have been encouraging.

As a small country Norway will always try to participate in international cooperation. My office thought it was important to support the work of ISO/TC 46/SC 10 "Physical Keeping of Documents", and we may have been instrumental for bringing the secretariat of this committee to Denmark. Ivar Hoel will say more about the work on a new international standard for permanent paper and the scope of this committee. As the chairperson of this committee, let me only ask for support from the library community to the work this committee tries to do to develop standards that may be beneficial for physical keeping of our intellectual heritage. There is no cultural heritage for anyone without some kind of physical vehicles.

A typical art library in my country is staffed by one or sometimes two qualified librarians. It goes without saying that most of those libraries will lack the resources for an ambitious conservation plan. But most of the Norwegian art libraries have important collections that will need some conservation measures.

What can art librarians do without adequate funding and technical resources? Fortunately the answer to this depressive question is not: Nothing! On the contrary there is much to be done. It is necessary to survey the collections and evaluate them, and we are now in the fortunate position that the new national library may microfilm crumbling material before it is lost. We hope that other means of conservation may be provided in the national library as a central servicepoint.

In recent years there has been an increased awareness of what librarians may do to preserve their holdings without the service of qualified conservators. These efforts may be indicated by the words *housekeeping routines*. It may not seem to be heroic to keep the books free from dust, provide acidfree boxes or covers for important or harmed items in the collection, or see to it that the stacks have a stable atmosphere without too much heat or damp, without insects, and without too many human beings with a shortsighted perspective on the holdings. It may not be heroic at all, but these efforts may be provided by all of us, and they make a great difference for the life expectansy of our holdings.

Sometimes a small problem opens up for a big perspective. That was certainly the case with a flood in a Norwegian medical library. The pages of periodicals printed on art paper were stuck together, and the volumes should have be thrown away if there had not been a librarian who started to wonder whether some enzymes could split the new and unwanted crosslinkings of the pages. Further research by Norwegian scientists on this crude process trying to save money has led to the opening of the petrified books from Herculaneum which for centuries

have been regardes as being preserved, but totally lost with regard to their intellectual content. There is hope for petrified as well as crumbling books if we are willing to do what is possible even in small countries with modest resources.

International Standardization of Requirements to Permanent Paper
A status report, April 1990

Ivar A. L. Hoel
Library Director, Royal School of Librarianship Copenhagen, Denmark

Abstract

Standardization of requirements to permanent paper takes place on many levels: national, European, and on the international level within ISO. Since 1987 it has been on the programme of work of ISO TC 46, where it is allocated to Subcommittee 10, "Physical keeping of documents".

Together with the ISO committee TC 6/SC2, Testing methods and quality specifications for Paper, board and pulp, a Working Group to draft a standard for permanent paper has been set up. There have been close contacts to the US group revising the ANSI standard from 1984, "Permanent paper for printed library materials", and the two standards are now being developed along the same lines.

Current work is indicating that both standards will cover uncoated and coated paper, and that they will contain requirements to strength measured by tear index, to minimum alkaline reserve, to maximum content of easily oxidizable material (especially lignin) measured by kappa number, and to maximum and minimum pH-value. It is still a matter for discussion whether the ISO standard is to include testing for retained properties after accelerated aging.

Two meanings of the word "permanence" in connection with paper are discussed, and librarians are advised to be aware of the issues involved and make themselves heard within the national ISO member bodies.

Standardization of requirements to permanent paper takes place on many levels. Since 1987, it has been on the programme of work of the Technical Committee TC 46, "Information and Documentation", of ISO, the International Standards Organisation. But the start of it was the work done in the USA, where the American National Standard "Permanent paper for printed library materials" (ANSI Z39.48-1984) was adopted in 1984, and is currently being revised. National standardization or at least some consideration of these issues is also being carried out in several other countries such as Austria, Federal Republic of Germany, Switzerland, Australia, Finland, Sweden, and the Netherlands.

In this context it is also to be mentioned that the European Standards Organisation, CEN, has created a Technical Committee for paper, board and pulp (TC 172), and has also decided to have a parallel vote on the ISO standard for permanent paper when it appears for ballot, that is to consider making the ISO standard also a European standard. CEN standards (designated EN - European Norm) have a more compulsory nature than the ISO standards inasmuch as they force the member states ot use them, and they may not have a national standard differing from the EN. In April this year CEN TC 172 decided to create an ad-hoc working group to look more closely into the question of permanent papers.

Within ISO, the permanent papers have been allocated to the Subcommittee 10 of TC 46. SC 10, named "Physical keeping of documents", has as its scope: "Standardization of requirements for documents and practices relating to documents, when the documents are to be used in libraries, archives, and documentation centres, and are to retain their character-

istics. Excluded: – photography and other media within the scope of TC 42; – micrographics and optical memories within the scope of TC 171".

Standardization of testing methods and quality requirements to paper is the responsibility of another ISO subcommittee, SC 2 of TC 6, "Paper, board and pulp". These two subcommittees in 1989 created a joint working group reporting to TC 46/SC 10: Working Group 1, "Permanence of paper for documents" to draft the standard. Convener of this Working Group, and also of the CEN ad-hoc working group just mentioned, is Dr. Per Olof Bethge, a paper scientist and paper and pulp standardization expert form the Swedish Pulp and Paper Research Institute in Stockholm. ISO/TC46/SC10/WG1, consisting of about 25 paper scientists, paper manufactures and librarians from many parts of the world has until now held two meetings, and hopefully will conclude its work when meeting in London in November. After that, the normal ISO procedures of balloting will start. This, briefly described, is the framework for the international standardization of requirements to permanent paper. What, then, can be said about the contents of this emerging standard?

There are two different ways of describing requirements to a material that is to be of long use. The first is to specify in detail the component parts of the material. Such a specification has to be founded on a long experience of what is good and what is not good. With respect to paper, this method would mean producing a recipe for the permanent paper production, for instance specifying that only rag fibres were allowed. The resulting formula may be a description of a paper of excellent quality, but the drawback is that is does not allow for new methods, new technologies, new experiences. Also, it is necessary that a standard for permanent paper specifies a paper that is commercially attractive to produce. Otherwise, the standard will have no effect other than to make some frustrated librarians believe that paper manufacturers form part of a wicked world. A permanent paper standard specifying rag paper – its excellent qualities untold – as the only permanent type of paper would have such an effect.

The second way is to specify measurable properties of the produced paper. On the face of it, this ought to be easy, as there exist more than hundred standardized paper tests. But the difficulty lies in choosing the tests that have any bearing on the permanence of the paper. For instance, a recent Swedish study has shown that the important property of tensile strength shows almost no decline after 80 years of natural aging. Tensile strength or properties directly related to tensile strength should thus not be used. It is impossible to test the permanence of paper by subjecting it to a full scale test, as the time scale would have to be hundreds of years. In practice, then, one has to rely on accelerated aging test, on observations made on historical documents, and on today's knowledge about factors in terms of paper properties and paper composition that promote a high degree of permanence.

The ANSI standard of 1984, and the present ISO work as well as the various national endeavours follow this second way. But there are some great differences of opinion as to the choice of factors to include in the specifications. Some are leaning rather heavily on the formula way of thinking, some want to specify forbidden components combined with a list of measurable properties, others again want only to measure properties after accelerated aging and say nothing about wanted or unwanted component parts. This last possibility I will come back to later on; it has not been the one chosen neither in the United States for the revised ANSI standard nor within ISO. Luckily, it can today be said that the international and the US work has been done on lines that are very clearly converging. The ANSI Revised Draft Standard of March 1990, and the ISO TC 46/SC 10/WG 1 Second Working Draft of October 1989 are modeled in the same way and listing almost the same set of measurable properties. Much of the remaining discussion will be of where to set the limiting values. It is too early to announce definite details, as nothing can be definite as yet, but as far as can be judged from

discussions that have taken place in April 1990, they both will address coated and uncoated paper and will probably include:

- **A minimum strength of the paper, measured by the tear resistance or tear index or a combination of both.**

The tear resistance/tear index is thought to be the most important strength measure in regard to permanency, if a single of the many possible strength measures are to be chosen. It is correlated more to fibre strength than to inter-fibre strength, and this is important as the most serious degradation mechanisms, notably acidic hydrolysis, attacks the cellulose and thus the fibre strength. The tear resistance measures the force necessary to tear the paper; the tear index takes into account that thicker and heavier paper also must be stronger than thinner papers. Viewpoints of librarians on whether this ought to be the case are welcome. The folding endurance test, much used during many decades, will not be part of neither the ISO nor ANSI standard, its reproducibility being very low.

It is still open to discussion whether the ISO standard shall include retention of tear resistance/index after a accelerated aging, and, if that is to be the case, how hot and humid the climate is to be and for how long time the paper shall be exposed to it. The ANSI standard will not include it. Acceleratad aging is an important testing method in many connections, but it may be impractical to include it in a standard, especially if it turns out that it does nothing but to confirm a quality of permanence that also can be determined by other and less time-consuming tests. A parallel testing procedure of about 20 different papers, performed in paper laboratories in eight different countries that is scheduled to take place the next couple of months will hopefully provide an answer.

A minimum level of tear resistance was included in the 1984 ANSI standard, based on what US paper manufacturers could provide. Whether this level ought to be altered (and that means lowered somewhat) in an International Standard remains to be decided. The US level may not be well suited to cover the papers that exist on the world market, perhaps being produced by processes that do not necessarily give a high initial strength. If the level is lowered, it will not be very detrimental to the permanence of the paper.

In this connection, it should be made clear that the standard in question does not specify the very durable papers that may be required for special purposes where high resistance to mechanical wear is important. Standardization of such "archival paper" should be the subject of another standard, and "permanence" one of the qualities needed in these archival papers. Denmark has proposed that work be started within ISO on such a standard.

- **Minimum content of substances (such as calcium carbonate) that prevent acid attack, measured by the alkaline reserve.**

This has for a long time been recognized as important, and should present no special difficulties. A minimum reserve equal to 2% of calcium carbonate will probably be upheld.

- **Maximum content of easily oxidized material, measured by the kappa number.**

The intention of such a requirement is to prevent the presence of lignin in the paper. In the ANSI 1984 standard is was required that there should be no groundwood or unbleached pulp present, in other words that the paper should be "wood-free". There was no method given for testing whether this was the case or not. It is for instance known that European papers that are designated wood free may contain as much as 10% of wood fibres. On the other hand, it is good to have a maximum value, as a minimal content of such fibres is practically unavoidable and will not make serious damage. In pulp testing it is common to measure the kappa number, a way of detecting the amount of oxidizable matter present, of which lignin

is the most common. It has now been shown that measurement of kappa number can be performed also on papers, and is a possible way of detecting the amount of lignin. This may turn out to be an important improvement of the standards. The alternative will be the use of traditional microscopic fibre furnish analysis.

• **Maximum and minimum pH-value of a water extract prepared from the paper.**
A minimum pH-value is an old requirement. In the future it is to be expected that both maximum and minimum values are given. The range is not definitely decided, but 7.0 and 10.5 measured by the cold extraction method will certainly be the most extreme values that can be accepted. (For coated papers, special methods of determining the value must be prescribed).

Papers complying with the old or revised ANSI standard may be marked with the well-known symbol of compliance: the mathematical sign of infinity placed within a circle. If a future ISO standard and the revised ANSI standard are not too different, as it now may be hoped for, the possibility exists that the symbol of compliance may be universally accepted and used. If that happens, it will be a major breakthrough in the promotion of permanent paper.

A probable prerequisite for this will be that an ISO standard does not include testing for the retention of properties after accelerated aging. At the same time, there has been considerable work done in the Federal Republic of Germany to establish both as a national standard and as a European standard a classification of paper into "life-span classes" or classes of permanence – and this is done by testing retention of mechanical properties after accelerated aging and by no other means. If that is accepted, it opens up for the use of a large variety of lignin-containing fibres in papers that according to a standard are classified as permanent! New lignin-containing fibres such as BCTMP (bleached chemo-thermo-mechanical pulp) may well turn out to be better than other mechanical pulps known, but many paper experts find it too early to accept them in permanent papers since they are so new and their properties not fully known.

In order to understand the discussion at hand, it is necessary to recognize that here two different ideas of what *permanence* means are being used. The ANSI and ISO work rely on a definition that goes back to W. J. Barrow's distinction between permanence and durability: "permanence is the ability of a paper to last at least several hundred years without significant deterioration under normal use and storage conditions in libraries and archives" (definition in the ANSI Draft Revised Standard). Following this view, permanence is a property which a paper either has or has not, and the standard is used to distinguish between the two types. Following the proposal promoted by the FRG paper standardization committee, the point of departure is that no paper is completely permanent, and that the important thing is to determine to what extent a certain paper has part in the quality of permanence. The purpose of a standard in that case will only be to determine the relevant testing methods, and the concept of life-span classes or permanence classes logically follows.

From a theoretical point of view, both ways of reasoning can be well argued. For libraries and archives, however, the possibility of a rapidly deteriorating paper being officially designed as belonging for instance to "Permanence class 6.40 according to the International Standard" is very unwanted. Such a designation is extremely misleading and should be avoided.

It has been argued that unless this life-span class thinking is used to introduce classes of quality of paper, a major part of the future paper produced will not be acceptable by librar-

ians. This probably rests on a misunderstanding of what the intention is of a standard for permanent paper. It is not to make most of the paper produced permanent according to a strict understanding of that word. There is no need for a major part of the paper to be classified as such. For instance, a lot of paper made for photocopying machines had better not be permanent. The intention of a standard for permanent paper is to make it possible for people buying or using paper to be certain that for documents that deserve a long life, the paper will live up to that. For instance, when a library wants to make a photocopy of a seriously degraded document, it should be able to buy permanent photocopying paper for that purpose.

This must not be taken to mean that librarians are against any kind of quality classification. The cause of the concern and controversy has been that the adjective "permanent" has been linked to papers that are definitely not so, thus disregarding the experiences of crumbling books that librarians and archivists during the last many decades have had, and also because permanence is linked to one type of permanence only: that of retaining the mechanical properties.

Paper can be tested for mechanical (physical), chemical, and optical properties. Permanence must mean the maximum retaining of all these properties. The proposal in the Federal Republic of Germany considers only mechanical permanence. If one were to follow that line of thinking, it is probable that librarians and archivists would demand that good optical properties also had to be retained. Papers going very yellow, or even brown, as lignin containing papers do, are for that very reason not permanent. Also, testing in a contaminated atmosphere ought to be included.

Other properties than the ones discussed here may also be included in an International Standard. Two that have been mentioned are optical (fluorescent) whitening agents and fungicidal agents. They are not probable for inclusion in a permanent paper standard. There is, however, the possibility of establishing a special standard for example for artist's papers, if that is needed. In such a standard these requirements, and also restrictions on the use of fillers could be important. Such papers would also have to classify as permanent papers. Furthermore, although the permanent paper standard is to be developed for paper for documents only, it can be foreseen that it will be used by many libraries and archives when choosing paper for wrappers, folders, envelopes etc.

The decision of whether to adopt an International Standard for permanent paper or not will follow the normal ISO procedures, and the national member bodies will give their votes when the ballot takes place. Librarians are not given any special saying in this matter. They have to make their voices heard in the national member bodies. If you believe these issues to be important, you should therefore act accordingly. At present the member countries of ISO TC 46/SC 10 are the following: Australia, Denmark, Finland, France, F.R. Germany, Italy, Japan, Norway, Poland, South Africa, Sweden, USA, and USSR are participating members. Bulgaria, Canada, China, DDR, Iceland, Republic of Korea, Thailand, and UK are observing members.

The Restoration of Posters from 1940–1945 in the Royal Library

Wijnand Goossens and Jacobus van de Watering
Paper Conservators
Royal Library, The Hague, Netherlands

Abstract
In 1983 the Royal Library in The Hague in The Netherlands took over a huge collection of posters from the RIOD (Dutch Institute for War Documentation).

An important part of this collection had been reinforced with tape. Through the years this tape had disintegrated and thus jeopardized the quality of the paper.

The restoration department of the Royal Library was able to treat the taped posters when the right method had been found to tacle the problems. This paper is about the different phases of the restoration process.

In 1983 the Royal Library (KB) received a request from the Dutch Institute for War Documentation (RIOD) to consider taking over a collection of posters which could no longer be adequately preserved by the RIOD due to lack of finance, space and manpower.

After careful consideration the KB decided to grant this request, since the collection was truly unique and of major (inter)national importance. The collection contained some 5,000 items and was handed over to the KB in 1985. Some 800 duplicates remained with the RIOD as an open study collection while the KB collection is primarily intended to be stored and preserved.

Origin and nature of the collection

After World War II an appeal was made to the Dutch people to part with all the relevant documentary material they had collected during the war, for the benefit of a special study centre shortly to be founded. This appeal was made by the RIOD (founded in 1945, as an aid to the historiography of the Second World War) and met with success. Among the material sent to the institute was a number of posters. Most of these had been kept by people,without ever having been used, and they were therefore, on the whole, in perfect condition. Others had been taken down from walls and fences, and although this gave them an added historical value, it had a bad effect on their physical condition.

On principle the RIOD did not purchase objects, but used duplicates as exchange copies. This resulted in a fairly complete collection. Although the collecting policy was aimed at material from the Netherlands during the war, a number of interesting foreign posters, including items from Russia and the Spanish Civil War, reached the institute along with the target collection.

Roughly speaking the collection can be divided into three categories. There are, first of all, the announcements made by the authorities, e.g. the draft for military service after general mobilization had been proclaimed, capitulation announcements, and subsequently the bilingual "Proclamations" of the occupiers, in Dutch and German. A second category is formed by the informatory posters, intended e.g. to advise the people about certain eating habits in time of food shortage. The third category consists of propaganda- and canvassingmaterial. Advertising material, in a sense, but aiming at "idealistic" objectives. When looking at this

category one experiences the most shocking confrontation: the superiority of National Socialism to capitalistic America and Bolshivist Russia is indicated in catching slogans and pictures, and, not surprisingly, the Nazi ideas about the absolute inferiority and wickedness of the Jews is illustrated by horrifying samples of propaganda.

There is a great difference in the design quality of the posters. Besides very professional samples in multi-colour printing one finds extremely amateuristic attempts, some even drawn by hand in editions limited to one or only a few. The quality of the paper varies greatly as well. As the war went on, material became increasingly scarce and paper deteriorated accordingly. Some posters were printed on both sides, or slightly altered so that they could be used again.

Use of the collection

The collection could be visited in the "poster-attic", where they were hanging on racks, attached to cardboard strips fastened by a sort of masking tape. After consulting the registration cards, containing an exact description of the posters with their thematic classification, visitors could search the racks for the relevant objects under the supervision of a RIOD staff member. Using masking tape had been advised in the early sixties, after scientific testing and subsequent approval. As the collection was regularly consulted and often used to provide illustrations in publications about the war, it was decided to reinforce the backs of the posters along the edges and the folds by using masking tape as well.

Unfortunately the adhesive components in the tape began to "sweat" and migrate to the front of the posters after some years. This phenomenon is also known from cellotape – often used for domestic purposes – which eventually gives way completely, leaving a shiny, brown trail of desiccated, hardened glue. The masking tape did not give way, but the adhesive wormed its way through the posters, with disastrous results. A lattice of brown marks appeared on the front of all the posters on which the tape had been used. The collection of duplicates, generally stored in portfolios, ironically, got off scot-free.

As indicated above, the KB was approached for the restoration of the posters. This was by no means a coincidence. Since the KB has moved to the new building estate near The Hague Central Station in 1982, it can boast a modern, well-equipped building, where climatic conditions can be accurately controlled, which is absolutely imperative for sound, professional conservation of sensitive materials like leather, wood and paper. Moreover it houses a large restoration department with the knowledge, skill and technical facilities for the effective application of diverse restoration methods.

Treating the Posters

After its arrival, the collection was first divided into very urgent cases (the so-called tape-posters) and those whose restoration could be temporarily postponed. The description below may provide an insight into the working methods followed at the KB.

Treatment is always phased. After a photograph has been made of the poster, it first of all undergoes "dry treatment": surface dirt, etc, is removed with powdered eraser. Next the tape is taken off, which is fairly easy after it has been heated by a hair-drier. The remaining adhesive is dissolved with white spirit and scratched off. Adhesive residues are dissolved as much as possible in an odourless kerosene bath. These treatments are applied in a special cabinet with permanent extraction, because white spirit and kerosene are both inflammable and a health hazard.

A kerosene bath is not immediately associated with "dry treatment", but is nevertheless considered "dry", because this liquid does not swell paper fibres. After the kerosene bath the posters are left to evaporate for 24 hours in a fume hood. This is followed by the "wet

treatment", for most posters also suffer from paper acidification. Paper is subject to acidification through a complex of factors, the most important being the composition of the paper itself and external factors like humidity, temperature and air pollution. The result is a gradual decay of its structure, which may eventually lead to zero flexibility: the paper simply crumbles on being handled. Ground-wood paper, on the market since 1840 due to shortage of raw materials, will certainly disintegrate if it has had an alum-rosin size treatment to allow better writing or printing. Paper made from good raw materials, like rags, also become acid, but the results are less dramatic.

During the war the correct raw materials were more and more difficult to obtain. All sorts of materials were used for papermaking. Consequently quite a number of posters suffer from acidification. As long as the "inner" structure of the paper is still sound, it may be saved by deacidification. The acidification process is stopped by treating the paper with an alkaline salt, which neutralizes and deactivates the acids. Moreover, by giving a sort of overdose, a buffer is added to prevent future acidification. All posters are deacidified by means of magnesium carbonate. This salt becomes magnesium bicarbonate by conducting carbonic dioxide through a high-pressure cylinder filled with water. Magnesium bicarbonate is easily soluble and is sprayed onto the posters. After evaporation of the carbonic acid the magnesium carbonate remains in the paper. For maximum result he paper should first be rinsed in water of c. 40° Celsius for half an hour. This soaks off remaining dirt and broken-off cellulose fibres, because the network of fibres will swell. This swelling also enables the magnesium carbonate to penetrate deeper into the paper. This method can, of course, not be applied to posters with water-sensitive inks or colours. In such cases deacidification takes place on a suction table, where a solution of alcohol and magnesium carbonate dissolved in water is drawn into the paper. This suction technique, combined with the fact that alcohol is safer for water-sensitive matter, will prevent ink and colours from bleeding and being washed away. Once the posters are dry again the "mechanical" damage is tackled: repairing tears and filling holes in the paper. Japanese mending paper is used, which is eminently suitable for restoration purposes because of the length of its composing fibres. Posters that are in a very bad condition are lined, i.e. a thin layer of Japanese paper is affixed to the back of the poster with watery starch. After that they are flattened, because wet treatment causes paper to cockle. The posters are slightly dampened, put between sheets of blotting paper and weighted with planks. Possible other rucks can also be removed in this way. After 24 hours they are dry and flat. The "reborn" posters are finally stored in chests of drawers. Horizontal storage is the best method for paper, but demands the greatest possible care to prevent new "mechanical" damage, if the posters are handled by researching visitors. Every poster has a conservation card on which all treatments are recorded for future reference. With the duplicate files of the RIOD documentation system in the KB and the photographs taken before treatment, these cards provide an excellent basis for research.

English translation by Lysbeth Croiset van Uchelen-Brouwer.

IFLA GENERAL CONFERENCE STOCKHOLM 1990

Section of Science and Technological Libraries

59-SCIE-2-E

The Strategic Management of Information : an essential element in the training of engineers.

by
Jean Michel
Ecole Nationale des Ponts et Chaussees

BEST COPY AVAILABLE

For internal use only:
Meeting No: 112
SI: yes/no

The Strategic Management of Information : an essential element in the training of engineers.

by
Jean Michel
Ecole Nationale des Ponts et Chaussees

Engineers, regardless of their background and training, seem to have a curious and paradoxical relationship with information and documentation.

It is generally recognized (and recent studies have proven it[1]), that engineers need and make abundant use of numerous sources of information in the process of creating and developing products and services. It is estimated that engineers in the American aerospace industry devote almost 35% of their work time, on average, to acquiring information and almost 31% of their time to communicating information to other persons.

However, despite the fact that engineers consider information to be vital resources in their professional activities, obtaining specialized information through numerous and various channels, they claim not to be particularly interested in the traditional services offered by documentation centres of the corporations. In the studies cited above, it was found that engineers make little use of databases.

Clearly, there is a gap between the engineers[2] method of obtaining information, and the information specialists methods of dispensing information. This is of course a slightly exaggerated generalization: some documentation services do serve the real needs of their engineer clients. However, the following two-part generalization appears to apply.:

- Documentalists and other information specialists do not understand the real information needs of engineers, and remain ignorant of their information acquisition process.

- Engineers are far from taking full advantage of the service which information specialists are in a position to offer them, and are not trained in or attuned to information management.

In the last ten years, serious efforts have been made in France to bridge this gap. Thus, one now finds information specialists being trained to recognize and respond to the needs of business people and engineers. On the other hand, engineering schools have undertaken to promote and offer courses in scientific and technical information.[3] The problem of the need for rapprochement between engineer and information specialist is being addressed by engineering bodies. The Committee on Engineering Information of the World federation of Engineering Organizations conducted a study to find a methodology to identify the needs of engineers.[4] As a result of this study, the WFEO has included in its program of activities for 1989-1993 the double task of training both documentalists and engineers in order to bring them closer together on the professional level.

This paper proposes to introduce a debate on the training of engineers, especially concerning the courses which focus on mastering professional information. The question of the appropriate training for documentalists will be touched on peripherally, as it has already been dealt with in other papers.
We will ask ourselves the following questions:

1. Why should we train engineering students, as well as professionally active engineers, in the effective use of information sources?
2. How should we evaluate such training, and how can we integrate it into the overall training of engineers?
3. More basically, how can we establish links between the effective use of information and new ways of working in engineering?
4. Finally, what role can information specialists and librarians play in the scenario we are proposing for training engineers?

1. Engineers and Strategic Mastery of Information

It has been said that engineers will henceforth use information as a primary resource. We know, too,[5] that information in all its forms now represents an essential element in the cost of running a modern business.

Should we be thinking that information, readily available and accessible, should not be managed? Ought we to be satisfied with old information practices based on an outdated pragmatism, at the very moment when business is faced with international competition and is making an effort to improve the competitiveness of its products?

These questions arise from the realization that no one in business really, knows how to manage the wealth of available information or put into effect a policy for actively managing information ; that no one is in a position to evaluate the disastrous consequences of poor use of specialized information.

Whereas much effort has been devoted in recent years to improving the management of human resources and developing better communication, no serious attention has been paid to managing the scientific, technical, and economic information that we term specialized.

On visiting business headquarters or interviewing engineers one notes the following unfortunate facts :

- Very few engineers and technicians take advantage of libraries and information centres, and even fewer search available databases.

- Many professionals (engineers or others) create permanent specialized information (in the form of lab tests, technical specifications, drawings, etc), but, with the exception of a few large corporations, nothing is done to handle this informational inheritance correctly.

- A majority of engineers are ignorant of the basic rules for protecting their ideas, knowledge or know-how. They do not know why or how to patent an invention, or how to arm themselves against the advances of industrial spies.

- There exists an inability from the over-abundance presently being offered, and there is serious difficulty in using statistical analysis to derive general principles from a multitude of heterogeneous data.

- Engineers have great difficulty exchanging specialized information, explaining their projects to decision-makers, and generally, communicating with specialists in other disciplines.

One could continue to list inadequences, all pointing to one problem, viz. Have engineers ever been properly trained to face the challenges posed by information acquisition and exchange? Before tackling the question of the training of engineers in specific form, we should set out some definitions and clarification of terms and concepts in the realm of strategic mastery of information.

Information : What is information for an engineer?

Information includes everything of relevance to the engineer's professional activities (eg. scientific and technical information), as well as everything pertaining to the engineer's work environment (the business firm, the market, the competition, technology, costs, human resources, international law, etc). Engineers need raw data (facts and figures) and textual data (reports, bibliographic references, etc). Information can thus be primary or secondary (in the terminology of information specialists. This information is basically complex, multidisciplinary, contrasting, even contradictory. It is disseminated in different ways, (interpersonal exchanges, audiovisual or written media) and derives from internal sources (one's own firm and its specialists) as well as external.

Mastering or Managing information : This means attending to the totality of the information environment, in other words, producing information, as well as finding and using it. It is important to know how engineers creating information in the same company have priority access to the same information. It is of equal concern to know how engineers, and how the firm manages this information so that other engineers access information sources, how they formulate their information needs, and how they go about searching for the relevant data or documents. Mastering or managing information means handling a stock of information, its flow in and out ; putting an economic value on various international solutions to needs ; understanding the role of different professionals in this procedure.

Strategic mastering of information : The main reason for choosing the term strategic lies in the fact that the engineer is a determining factor (or agent) in the proper running of the business. The engineers information needs are one element in the needs of the whole business (or enterprise). Mastering information cannot be viewed as depending solely on the personal or individual concerns of the engineer. The engineers needs must be understood in terms of the overall strategy of the company vis-á-vis competitiveness and constraints.

The strategic management of information is therefore an indispensable tool for engineers wishing to fulfil their role as agents of change (or "movers") in business. We ought not to forget that basically engineers transform information and knowledge in order to bring into being the products and services offered by their employer. Ultimately the work of engineers could well be described as a permanent process of mobilizing, transforming, and producing information.

2. Training engineers in the strategic management of Information

Specialists concerned with training engineers, are currently distinguished by several schools of thought, according to which the engineer is either a generalist or a specialist, situated in either the technical or the management sphere. In Europe one can see these points of view co-habiting, or opposing each other, or ignoring each other (perhaps being unaware of each other).[6]

For some, the engineer is a "super-technician", the semantic link between "engineer" and "engine" being the predominant connection. In this scenario the engineer learns his profession by acquiring technical "recipes", building technical objects himself, and trying to latch on to a business firm.

Others see the engineer as primarily a scientist, a specialist in a certain scientific discipline. In this case the engineer early in his career becomes a member of the appropriate department of a technical university, where he/she can advance his knowledge through contact with teaching faculty, specialists in their field. Lab work and research are an essential ingredient in training.

For others, finally, the engineer exists only to respond in a variety of ways to the needs of people and society. His task is to "assemble" techniques and manage various resources. In this case, training emphasizes multidisciplinarity, and an approach to situations based on needs and economics.

A programme to train engineers in managing information must be structured according to the choice of model and the cultural environment in which one operates.

Thus, programmes aimed at the engineer-as-technician, or the engineer-as-scientist, or the engineer-as-manager,will have appreciably different objectives and methods. Each engineer should have the opportunity to follow the most suitable path available.[7] Having said this, we can set several general rules, and formulate certain propositions acceptable to a large number of establishments

Training strategies and their consequences

The minimum that one would hope to find in all technical universities and other engineering schools is an attempt to make the engineering student aware of various information and documentation methodologies. This introductory training should be offered at the very beginning of professional instruction to all students, in order to facilitate their use of the information and documentation resources put at their disposal by teaching and working institutions.

The next higher level of training would relate more specifically to the work of the engineer, by introducing instructional modules aimed at students' acquiring knowledge (or skills) in the strategic mastery of information, placing it in the context of the everyday work of the engineer.

Finally, a third instructional strategy would involve students and engineers who could apply these information skills to a particular speciality. These would be doubly competent (or skilled) in engineering and information processing. (Conceivably, one could be training engineers whose speciality is the cutting edge of technology.)

Information instruction in various environments.

Another way of approaching this learning process is by considering all the contents where teaching could be affected. The initial training undergone by engineers is of course one obvious context. There are others which ought not to be ignored :

- higher education in the form of research and doctoral training is one possible way for using instructional modules in information processing

- continuing education can serve equally to introduce novel experiences, such as teaching working engineers how to apply for a patent, how to protect original ideas and research, how to counter industrial espionage. Technological innovation would be an ideal subject for continuing education aimed at engineers aged 35-40.

Desirable course contents

We should point out that the training outlined above is in no way aimed at producing documentalists, or engineers with a grounding in cataloguing rules.

Failures experienced in training engineers in information skills sometimes result from a confusion in goals. Training engineers is vastly different from the acquisition of professional skills and knowledge by professional documentalists and libraries.

Specific instructions for engineers should include the following elements :

- how to define and formulate one's own information needs and those of one's employer.
- how to evaluate the cost of particular information strategies and how to make effective decisions on their cost effectiveness.
- how to access information from a variety of sources.
- how to sort information, evaluate the acquired documentation, establish a synthesis.
- how to manage the information produced or collected.
- how to stimulate the creation of relevant information within the company.

- how to put knowledge to use; how to patent, create norms, diffuse (disseminate) information.
- how to view the information environment, use databases, keep up with technological developments.
- how to integrate information and documentation in the planning process.
- how to set up effective in-house information systems.

This list is by no means exhaustive. Each establishment can obviously determine the contents of specific courses.[8]

Effective pedagogical modalities.

Although the most common way to introduce information is still a visit to a library or documentation centre, this is scarcely adequate for the training we have referred to above. Much more is needed. It is imperative that this training (initial, in-depth, or specialized) be an integral part of the professional training offered to engineers. Courses and seminars must be organized and laid out to students. Individual and group projects must be a required part of the course. The students' theses or papers must acknowledge the information environment of each specific subject under discussion.

3. Thinking about information and the engineer of tomorrow

Lets take a step back and reformulate the problem in the following terms : How will information transform the working conditions of tomorrow's engineer? Or again, which model of engineer should we favour? Put in these terms, the question of information training for engineers brings us to the question of professional education for tomorrow's engineer.

One can state without exaggeration that the engineer of the 21st century will differ greatly from his 19th century counterpart in that his profession will reflect the ever-increasing intrinsic weight of information in its products and services. The 21st century engineer will face new ways of moving about knowledge, ever widening the horizons of possibility, and requiring ways of comprehending an ever more complex reality.

Training engineers in effective information management should anticipate (or more modestly, catch up with) certain evolutionary developments. For example :

Quality is an element that business enterprises nowadays insist on including. But quality is nothing more than a process of managing information. Quality control, overall quality, quality assurance, reliability, safety - all require the proper handling and dissemination of information. The convergence of data from different sectors, statistical analysis, cost analysis - these are all pieces of specialized information that go into the concept of quality.

Work methodologies, problem solving and systems analysis are now fully exploited by competitive business. Methods like cost analysis, or techniques promoting creativity have proved their worth and bear witness to the interest currently shown in team-work, in identifying needs, or in the concept of project planning as ways to resolve problems.[9] All these methods have one element in common : the need to manage information. The effectiveness of any team depends on its ability to mobilize, handle, and re-fashion available information. There is an essential link between methodology (ways of organizing work flow) on the one hand, and information on the other hand.[10] It is this relationship which engineers have not yet completely uncovered, and which ought to be exposed in any program designed to teach strategic information management.

The problem of engineering intelligence is a third element currently in the process of evolving. Artificial intelligence and expert systems are

now accepted key-words in the engineers working vocabulary. Whether one is interested in problems of production, or is trying to oversee telecommunication networks, it is obvious that the computer has effectively replaced the engineer, the laborious calculator. But, besides, or beyond the machine, there is a need for knowledge, databases, and laws. Nowadays we have gone back to the basics. Under these circumstances, training in strategic management of information links up neatly to the new engineering intelligence.

The globalization of the economy, the opening of frontiers, the movement of people and goods - these introduce a new factor to be taken into account in the training of engineers : the multiplicity of cultures and the encounters between them. For several years now, educators have imposed the task of learning foreign languages on their engineering students. Now it is equally necessary that engineers be fluent in international marketing data. Thus, the act of conceiving, realizing, and commercializing various industrial products involves many participants from all over the globe, and obliges the engineer to learn to work with partners of differing linguistic and cultural backgrounds. Strategic management of information must embrace the reality of the mingling of cultures.

4. What is the role of information specialists?

Although it is easy to see what role is played by teachers of mathematics, or mechanics, or biotechnology, it is less easy to decide who should be teaching strategic management of information.

Should we be availing ourselves of teachers (or researchers) specialized in this field (if they do exist)? Should we be asking teachers in more traditional disciples to integrate this subject in their courses? Or should we be calling upon documentalists or librarians?

Clearly the ideal would be to engage teams of instructors representing all these backgrounds : theoreticians and practitioners, information specialists and technical experts. From a general point of view, it would not appear strange if personnel from technical university libraries or documentation centres were to take an active part in teaching programmes, or even be in charge of such training.

However, certain conditions ought to be respected :

- existence of technical resources and adequate, effective personnel.
- eventual creation of a chair or position responsible for teaching strategic management of information (either in a university library, or in conjunction with it).
- inclusion in the teaching program of specialists from other university departments, or from outside.
- reduction of the percentage of the training program devoted to exposure to traditional library catalogues.
- especially adoption of a mentality closer to the engineers point of view than to the documentalist's, in order to better understand the specific needs of the engineer.

As long as these conditions are respected, it is altogether appropriate for information specialists, and working librarians (in a technical teaching institution), to develop new professional skills oriented toward the strategic management of information, to conduct research in this field, to act as consultants, and to contribute fully to the training of new engineers.

Few conclusive experiments have yet been conducted to further the possibilities inherent in the strategic management of information. However it is highly probable that the 1990s will determine the matter, and that initiatives will soon be taken in this direction in training programs for engineers.

(Translated by Wayne LeBel)

IFLA GENERAL CONFERENCE STOCKHOLM 1990

Division: Special Libraries

Section/RT: Administrative libraries

113-ADM-2-E

Government libraries in Sweden - A survey of information services

Eva B. Björck
Chief librarian
National Defence Research Establishment
Department of Information Technology/ Library
P.O. Box 1165
S-581 11 Linköping
Sweden

For internal use only:

Meeting No: 119

SI: yes/no

IFLA 90:Section for administrative libraries.

Government libraries in Sweden - A survey of information services.

Eva B. Björck

ABSTRACT

Libraries serving the Swedish government agencies show great variations regarding collections, service level and staff qualifications. The Swedish administrative sector is divided intp ministries according to different sectors. Library collections and services are, with few exceptions, used exclusively by ministry staff. Subordinate to each ministry there are many government agencies. Some of these agencies support library activities and information service centers with a high level of staff competence and highly specialized collections. The Swedish Agency for Administrative Development (SAFAD) has a special mission to give advice and support for rationalization of administrative agencies. The SAFAD library has made important contributions to improve and evaluate government library routines through seminars, reports and has also set a good example for an effective library service. Another example of a "support"- agency is the state-owned computer service-bureau DAFA. A survey of databases with administrative facts, statistics, legal information and bibliographic information will be given. Questions concerning responsibility, availability and funding for public sector databases will be discussed. In the public sector there are also county government boards as well as an extensive amount of regional and local agencies which are part of the network of "information providers and users".

Introduction:

The Swedish public sector - a short introduction.

Sweden has a representative and parliamentary constitution. "All public power in Sweden proceeds from the people." So runs the opening sentence of Chapter 1, Article 1 of the Instrument of Government. The *Riksdag* is the foremost representative of the people and is appointed by free, secret and direct elections. The government rules the country. It is responsible to the *Riksdag*. The King or Queen who occupies the throne of Sweden in accordance with the Act of Succession shall be the Head of State. A Government Chancery shall exist for the preparation of Government business . This Chancery shall comprise ministries for different fields of activity. The ministries have no right to make decisions but have only a preparatory function. A total of about 200 official reports per year are published by the ministries. In preparing this huge amount of reports there is a great need for updated and reliable information sources such as all kind of statistics, market information etc. Within each sector, government agencies are subordinate to a ministry. To the contrary to the ministry, the agencies are independent towards the government but all activities are regulated by laws and statutes.

In comparison with other countries of the same size and industrialization level, Sweden has a very big public sector. With ca 1,5 milj. government employees, of which 391 000 in state employment, 1 241 000 in local employment. (total population ca 8,5 milj. in 1988), the public sector is the biggest employer in Sweden.

During the eighties, when financial restraint became necessary, government officials decided that the public sector could not be allowed to grow any more and plans for changes were made and are, to a certain extent, already implemented. A constantly continuing process of changes in the view on management, in ways of economic control, demand for renewal and cuts has had a great influence on government agencies, including,their libraries. During the seventies decisions were taken to allocate about 60 government agencies to other cities than Stockholm. Of course this had an effect on the libraries connected to the allocated organisations. Many a store-room had to be cleared out and lots of old material were thrown away, sometimes in a great hurry. Some collections were offered and partly recieved by the 1969 established university library in Linköping. Most libraries got new and better premises in the new buildings. Even if the collections were reduced, someone in the management had decided that they wanted and felt a need for library services.

Libraries serving the Swedish ministries show great variations regarding collections, service level and staff qualifications. In order to give an apprehension of the size of libraries serving ministry staff some figures are given in Table 1.

In this context it should be noted that Swedish ministry libraries are not depository units for government publications. Only the Riksdag library has been given the right by a Royal Decree to receive under legal deposit a copy of every printed or photocopied publication from all governmental authorities.

Library serving the ministries of:	collections/vols	periodicals	staff
Justice	30 000	255	2
Foreign Affairs	90 000	400	8
Defence	13 000	300	2
Health and Social affairs and M. of Housing and Physical Planning	15 000	250	3,5
Transport and Communication	8 000	170	0,5
Finance	10 000	275	3
Education and Cultural affairs	17 000	250	3
Department of Agriculture	17 500	400	1,5
Labour(-market)	12 000	175	2
Industry & M. of Environment and Energy	16 000	104	2
Public Administration	12 000	200	1,5

Table 1. Ministry libraries: Collections and staff. Some figures

Source: Library and information services in Sweden. Gunvor Bergsten and Ingrid Chambert (eds.) Stockholm 1988.- 267 p. (TLS handbook 18) (Text in Swedish)

These libraries are, with few exceptions, used exclusively by ministry staff and other employees within the public sector. This kind of internal libraries are often "invisible". It is rare to find them in official organizational overviews, and in the Directory of the Swedish public Sector (Statliga myndigheter) there are only a few mentioned despite the fact that most organisations have their own libraries. No trace is to be found in the official statistics either. But these libraries have a very important role to perform within their organizations. All the same, in times of financial difficulties, there are always suggestions on seeking library services outside the organization and many libaries have faced questions as "what good do you do to the organization", "how do you perform and to what price" etc. Many reports with attempts to describe library service levels have been published over the years. In 1984 a survey of government libraries was carried out by INFORSK (Höglund ... 1985, p 129). It revealed that 120 agencies in fact have libraries. About 50 % had only one person, every third library had 2-3 persons, and only five had more that 5 persons working in the library. Considering the size of these libraries it is suprising that every third library, by the time for the survey, answered that they could offer database searches and every fifth library used some kind of computer based support for library routines.

Library statistics can only reflect activities in terms of quantity not quality and the figures are, in many cases not complete, not given and thus neither compatible nor reliable, but may serve as an indication of how much material is handled and by how many. Even if most of the ministry libraries are small, their service are not limited only to their own collections but they use the services offered by large special libraries with responsiblity to cover specific subject areas. To get an apprehension of the resources available, Table 2 gives an overview of selected figures of the activities at one representative special library within each subject field.

Subject field:	reg. users (employees)	collection in meters	micro-media	perio-dicals	growth meter/year	loans, total	photo-copies	database searches SDI	database searches Retrospect.	"In-house" databases growth	Staff
Psychology/ Education	3 200	3 850	355 000	1 150	80	24 000	63 000	12	346	450	15
Statistics	2 000 (4 300)	7 100	7 800	4 330	115	25 000	13 000	-	380	-	19
Defence	950 (1 100)	4 700	385 000	2 200	200	12 000	8 000	109	1 139	4 600	15
Transportation	200 (300)	800		1 305	40	6 300	20 000	72	70	2 900	7
Environment	500 (600)	440	23 000	450	10	6 500	3 000	7	300	1 500	13
Telecommunications	3 500 (48 000)	2 400		1 037	20	14 500	54 000	118	694		10
Administration	850 (1 100)	506		330	36	12 000	50		175		4

Table 2. Special libraries - statistics selected from the official publication:
Statistiska Meddelanden KU 13 SM 8901.
Research libraries 1988. Cultural statistics. SCB.

The Swedish public sector was very early to introduce office automation, to use networks, office mail systems, electronic conference systems etc. The libraries were slower to catch up with the new technology because of lack of financial resources as well as lack of knowledge of possible impact of new technology in library services. The university libraries and the bigger research and special libraries had already in the early seventies passed the initial stage of computerization by participating in the Swedish online library system (LIBRIS). For many reasons, not all libraries could participate in the LIBRIS project. The expanding market of different softwares and hardwares gave librarians in small libraries a hard time to chose adequate systems. The road to cooperation and sharing resources is not an easy one. It is therefore very impressive that eleven ministry libraries are together in a project to share the same computerized library catalogue system.
SAFAD (Swedish Agency for Administrative Development=Statskontoret) has a special mission in supporting the rationalization of public administration. The SAFAD library has made important contributions to improve and evaluate library routines through reports, seminars and has also set a good example for an effective library service.

SAFAD has, by direction of the Swedish government, made an inventory of the Swedish database market, especially databases produced by the public administration. The inventory includes databases produced by government authorities, county administration boards and also some of the Swedish public online databases. Foreign databases were excluded from the survey. The SAFAD survey gives information about 440 databases of which 370 are produced by the public administration.

Sector:	Public sector	Online-market
Type of data:	number of databases	
Facts References Full text	300 (20 *) 50 (25 *) 25 (25 *)	20 (18 *) 30 (28 *) 15 (15 *)

Table 3. Approximate number and type of databases produced by the public sector and online market.

* Numbers in brackets indicate how many are publicly available

The main purposes for compiling the survey were:

- increased efficiency - cooperation
- increased availability - increased democracy

Databases containing *facts* and *full text* are primarily produced as tools for officials in their daily work. Government libraries have had no, or little influence on the creation of these databases.

It has become more and more obvious that librarians wanting to develop and improve their services must have knowledge and also access to these types of databases not only to internal and external *reference* databases. The SAFAD database survey is a tool for the whole society in order to create the so called "INFORMATION SOCIETY".

Administrative librarians feel a strong responsibility to participate in collecting information and marketing the ways and means of access.

The idea that a library is a kind of resort place where librarians are living an idle life, sorting books and dusting shelves, is still common among many library users. Most administrative libraries originate from some bookshelfs left by an official or from boxes of old and dusty volumes found in some store-room. The picture of the library as an archive more than an information center is derived very much from this origin.

Can it be changed? It can and it has been done. It is very much a matter of attitudes among staff and customers. Over and over again, it must be proven to the users that the library is a knowledge bank handled by professionals, not only a place where library workers are handling with documents. The status of a library is dependent on user-confidence.

It is not enough to have good collections. Service is the keyword. The user must get a feeling that the staff really are committed to what they are doing and take an active interest in his/her questions.

Documents in paper form are still necessary in a library as a lot of information still is found only in printed versions of sources. Even if the source of information is known to be found in a database there may be some difficulties to reach it. Database hosts have been established to solve most of the problems. The state-owned computer-service bureau DAFA is providing a network of databases and performs as an *information market-place*. DAFA offers about 15 databases with a wide range of different types of information such as, legal information, records from the Swedish parliament, environment information, statistical facts, population index, business and company information, car registrations, corporations, Nordic database guide, project index from the National Board of Education, etc.

Some of the information, for example about individuals, health information etc, is highly restricted and can only be reached by special permission, but surprisingly much of the information is open and available not only to officials but to all citizens.

The *Legal Database* (Rättsbanken) is a collection of different databases containing references, facts, full text

* all kinds of legal cases in full text searchable on paragraphs of the law (General Courts, Labour Court, Rents and Tenancies Court of Appeal, Social Insurance Courts, Administrative Court)
* Riksdagen. Database containing citations and indexes to documents produced by the Swedish legislatures, including bills, motions, interpellations etc
* tax information
* official publications, Government publications
* legal literature
* marketing and consumer rights, National Board for Consumer Complaints, National Board for Consumer Politics, Market Court, Competition Ombudsman
* social regulations
* statute-books, for instance from Board of Customs, Board for Consumer Politics
* employer agreements

The cost to create, update and maintain the databases is counted in hundreds of millions of crowns. To make ends meet there are fees. As an example there is an initial connection fee of 3000 Swedish crowns (SEK), a yearly subscription fee of 1500 SEK and a search cost of 750 SEK per hour for the Legal database, but this is the most expensive database. In most cases there is only a subscription fee, ranging from 200 to 7000 SEK and search time fees ranging from about 1 SEK (for LIBRIS)/per transaction to 750 SEK per hour.

The slogan "Information is available within reach of your fingertips" i. e. from your terminal sounds good but in reality librarians have to make priorities and as a result increasing costs, it may change into "information is available within reach of your financial resources".

The subscription fee is to be paid if the database is used or not and many a librarian would rather have the option not to *subscribe* to databases but pay a higher search-time fee when the information really is needed.

More tools to find information:

SCANNET is the editorial body for the publication Nordic Databases, a directory of on-line databases in the Nordic countries. Some examples of Swedish databases are mentioned here:

The directory provides information about coverage, updating frequency, annual growth, time-span, data host and distributor, costs etc.

Reference databases:

BALTIC: Bibliographic references covering all aspects on the marine environment

BODIL: Bibliografic database for housing planning, environment, construction, civil engineering, building services, energy saving and related fields.

FOABIB: Bibliographic database containing references to open reports produced by the National Defence Research Establishment

LIBRIS: Bibliographic database for university and research libraries in Sweden

List Stat: Bibliographic database (Statistics Sweden)

NATUR: Nordic Regional database containing references, data about projects, facts in the field of environment

ROADLINE contains references to documents on transportation, roads and traffic

Non-bibliographic databases/ factual and numeric

BASUN:	(Basuppgifter om näringsidkare=Specifications on manufacturers), is a general business register of all companies, organisations and government agencies in Sweden.
BolagsAnalys:	Company Analysis: gives economic information from 16 000 companies in Sweden, 1983-.
BVR:	ByggVaruRegistret (Building Commodity file) contains information on Swedish building installation products and their suppliers.
BYGGFO:	Ongoing building research projects (Reports are registred in BODIL).
Dagens börs:	(Stock market information): Prices, trends and statistics
DEMOGRAPHIC DATABASE:	A socio-demographic archive with historical data of inhabitants in certain parishes in different parts of Sweden. Time span 1720-1900.
DIREKT:	Business news, information about stock exchange and companies
DR Direkt:	A directory containing names, addresses and other mailing information on companies and public entities in Sweden.

DUS:	Education in Sweden, gives answers to questions like, In which place can I find this education? Which education can I find in this place?
KOMPASS ONLINE:	Kompass Denmark. Norway, Sweden, Germany, Suisse, UK and Ireland containing product information.
REFDIR:	Reference directory to libraries, archives, research groups, authorities, database producers and vendors of interest to social researcher and administrators in the public sector.
REGISTER:	contains citations to Swedish regulations within the areas of building, energy saving, enrionmental technology, physical planning, and urban technology.
RSDB:	Regional Statistical DataBase contains statistics on Sweden classified by county and municipality.
SIND-DATA:	purely statistical data to make it possible to study the profitability distribution of the Swedish industry in different sectors and regions - but no single enterprise can be distinguished.
SPAR:	Directory of Swedish residents. Contains only information of a type which is not regarded as invasion of privacy.
Tidnings-databasen:	(Newspaper database) Full text of ca 10 journals covering economics and business news.
Valutor och räntor:	Currencies and interest rates- numeric database

There are also databases for the medical field including occupational and environmental areas which are very important sources for the social and health sector.

Some examples are given here:

Cancerlit

Cisilo

Dalctraf (Drugs, ALCohol and TRAFfic)

Drugline contains problem-oriented drug information

MBline- Environmental-occupational

MEDLINE - bibliographic references (international)

RTECS- Register of Toxic Effects of Chemical Substances

SPRILINE

SWEDIS- Swedish Drug Information System

Swemed

Of course there are more, especially international databases which are frequently used by most libraries but this overview is not meant to be a complete catalogue, but to give a general concept of nationally produced information.

Conclusion:

Today, most libraries are not confined only to bibliographic information but have opened the window to the world of information. One, very important mission is to provide education for library customers in using the information as tools in their daily work. There are many obstacles to reach the ideal situation where administrators and managers in government offices and agencies always bear the library in mind before they start investigations and projects. Library staff must have skills to inform their users and to reach the non-users users not only about bibliographic information but also to market the continously growing database market.

The phrase that the librarian is an intermediary link is more true now than when it was minted. Today it is a necessity for all libraries in all sectors to communicate with other information providers and get resources to improve library and information services. If I may express a personal opinion, there is still a great need for further educational efforts for library workers and potential library and information users in order to increase the conciousness of the importance of high quality in libraries regarding both collection consistency and staff qualifications. Library workers should also take an active role as information consultants and participate in projects inititated within their organisation.

Let me finish this paper by citing Muriel Regan, president of SLA. I think it applies to all librarians and information specialists and to whatever type of library.

"Special librarians are in the forefront, running fast, running hard, running ahead. I want to see us learn to empower ourselves and attain the status, financial rewards, and satisfaction of empowerment that we deserve."

REFERENCES:

ABC för förvaltningsbibliotek. (ABC for government libraries. Text in Swedish.) Sammanställd av/Comp. by Gertrud Hallvig and Marie Louise Norrman. Stockholm: Liber,1980.- 88 s. (Statskontoret. Rapport 1980:3) ISBN 91-38-05435-3

Bibliotekets nya roll. (A new role for libraries. Text in Swedish.) Red./Ed. Gertrud Hallvig. Stockholm: Statskontoret, 1986.- 84 s. (Statskontorets småskrifter. 12) ISBN 91-7220-024-3

Biblioteks- och informationstjänster i Sverige. (Library and information services in Sweden. A directory. Text in Swedish) Sammanställd av Gunvor Bergsten och Ingrid Chambert. Stockholm: TLS, 1988.-267 s. (TLS handbok 18.) ISBN 91-7390-019-2

Billedi, Ibolya, The status and social prestige of the library and information profession: An international survey. *// IFLA journal.- Vol. 15:4 (1989) pp 324-329.*

Constitutional documents of Sweden. (Translation into English of) The Instrument of Government, the Riksdag Act, the Act of Succession and the Freedom of the Press Act. Publ. by the Swedish Riksdag. Stockholm 1990.- 156 p. (See pp 37-)

Höglund, Lars, Bibliotekets roll. Litteraturförsörjning och biblioteksanvändning i forskningsmiljö. (The role of the library. Literature supply and library use in research. Text in Swedish. Abstract in English.) Umeå 1983.- 45 s. (INFORSK papers on communication studies. Report No 18.) (ISSN 0348-4068)

Höglund, Lars & Persson, Olle, Information och kunskap. Informationsförsörjning - forskning och policyfrågor. (Information and knowledge. Information supply - research and policy. Text in Swedish.) Umeå: INUM AB Publishing division, 1985.- 164 s. Bibliogr. pp 156- 164. ISBN 91-970778-0-1

Höglund, Lars & Persson, Olle, Kunskap om kunskapshantering. (Knowledge on knowledge handling. Text in Swedish.) // *Tvärsnitt.- 1988:4 s. 97-104*

Information services on research in progress. A worldwide inventory. Ed by the Smithonian Science Information Exchange, Inc. and comp. with the support by Unesco and UNISIST. 2. ed.- Paris: Unesco, 1982.- 330 p. (cfr pp 209-214, Sweden)

Informationsbaser (Information databases. Text in Swedish.)
1: I förvaltning och samhälle: En katalog. 1988.- 135 s. ISBN 91-7220-051-0 (Statskontoret. Rapport 1987:49)
2: Inventering, analys, förslag. 1988.- ca 200 s. ISBN 91-7220-055-3. (Statskontoret. Rapport 1987:50)
4: Samhällsinformation & medborgarinflytande. Utarb. av Christina Johannesson. 1988.-71 s. ISBN 91-7220-088-X. (Statskontoret. Rapport 1988:45)
8. Erfarenheter av samhällsinformation på CD-ROM. (Experience of public information on CD-ROM. Text in Swedish). Sammanställd av Christina Johannesson och Peter Kempinsky och under medverkan av Gertrud Hallvig, Kjell Norman och Malou Norrman. ISBN 91-7220-127-4. (Statskontoret rapport 1989:45)

Lidman, Tomas, Libraries in Sweden. // *IFLA journal.- Vol 16:2 (1990) pp 187-197*

Nordic Databases 1990. Ed by SCANNET: Elisabet Mickos and Maria von Hertzen. Esbo: Scannet, 1990.- 158 p. (NORDINFO-publikation 17.) ISBN 951-47-3591-9. Corrections and updating in SCANNET TODAY.

Offentliga sektorn. Utveckling och nuläge. (The Swedish public sector. Developments and present situation. Statistics Sweden. Text in Swedish.) Utg. 2. Stockholm: SCB, 1990.-187 s. ISBN 91-618-0378-2

Regan, Muriel, The special librarian as a front runner: running fast, running hard, running ahead. // *Special libraries.- Spring 1990 pp 92-96.*

SAFAD See Statskontoret

SLA (Special Libraries Association.) Value of the information professional. Washington, DC, 1987.

Spaulding, Frank H., Image of the librarian/information professional. // *IFLA journal.- Vol 15:4 (1989) pp 320-323.*

Statistik/statistics:

Statistisk årsbok för Sverige 1990/Statistical abstract of Sweden. (Text in Swedish. Only headlines in English.)

Statistiska meddelanden. Forskningsbiblioteken 1988. Kulturstatistik. KU 13 SM 8901. (Research libraries 1988.) (Text in Swedish, only headlines in English.)

Statliga myndigheter. Verksamhet, organisation och ekonomi. (Government authorities. A directory. Text in Swedish, names of the organisations translated into English. Stockholm: Statskontoret. Årlig/Annual.

Statliga publikationer. Årsbibliografi. (Årlig årsbok över svenska statens publikationer, utgiven sedan 1931.). (Swedish government publications. Annual bibliography.) Utg./Ed. by Riksdagsbiblioteket. Stockholm: Allmänna förlaget

Statskontoret. Temadagar 1977-. Samverkan mellan förvaltningsbibliotek. (=SAFAD. Workshops 1977-. Cooperation between government libraries.)

Suneson Mona & Jakobsson Arne, Förvaltningsbibliotekskräff i Stockholm. A summary from a government library (county council libraries) workshop in January 1990. // *DIK-forum.- 1990:5 s.15.*

Surveys on library and information services:
Statskontoret. Rapport. 1987:32 (SNV, National Environment Protection Board)
1988:38 (FFA, The Aeronautical Research Institute of Sweden)
1989:26 (VATTENFALL. Swedish State Power Board)

Tell Björn, Samverkan och universalism i biblioteksarbetet. // Eftertankar i informationsåldern. Problemet informationsförsörjning. Red.: Anders Björnsson. Stockholm: Allmänna förlaget 1988.- 127 s. (DFI Publikationer 1988:1) s. 33-38. ISBN 91-38-12119-7

IFLA

Division: Special Libraries

Section: Administrative Libraries

159-ADM-3-E

On the problem of library collections requiring constant amendment and updating, as exemplified by patent specifications which, together with other literature, constitute legally relevant documentation when examining for novelty.

by Gerhard K r u s e

European Patent Office Munich

For internal use only

Meeting Nr.: 119

SI: ~~yes~~/no

Estimated number of participants in the meeting:

Keywords:

CD-ROMs
Updating of Collections

Those reference works which are changing all the time - be they the texts of laws and commentaries, library catalogues, lists of individuals and institutions, manuals of standards or, as in our case, classified patent collections - have always entailed considerable problems in libraries: they have to be kept up to date, for where else if not in a scientific library is the reader entitled to expect carefully and professionally managed collections reflecting the latest legislative and other developments.

Simply to maintain them takes one librarian post for every 400 sets or so. To this must be added a fool-proof bibliographical monitoring system, for it is by no means certain that a particular supplement on order will actually arrive in time, for example when the law enters into force. Often they are received too late to save having to scan the appropriate legal gazettes.

This is where the librarian's responsibility towards his clients starts, for he can hardly blame the bookseller if sued after giving incorrect or outdated information.

In the days when paper was the only medium, such errors could only be avoided through meticulous bibliographic research and a minute check of any supplements.

But times have changed radically. We all know that the quality yardsticks of 30 years ago can no longer be applied to today's librarian, but on the other hand we do now have media available

to make our work much easier and the information process far quicker. With these we can offer users a hitherto undreamt-of range of services, although this requires that our clients too adopt new working methods which all-too-many scientists have yet to turn to their account.

This confronts the librarian as "information broker" with major new tasks, and he has to try to organise his electronic works of reference so as to provide as much information as cost-effectively as possible.

I began by talking about loose-leaf collections; this brings me on to the other kinds of collections which are growing all the time and pose such problems of planning, storage and updating.

When setting up a library, who - for all the ease with requirements can be estimated - can make a convincing case for having 200 metres of shelving for a particular set of reports? Those holding the purse-strings only see the empty shelves; they do not know as we do that every library eventually becomes too small.

We are constantly having to add new items to classified collections - often kept in as many as 200 libraries in a single country - to ensure that the latest information is always immediately available. So the same work is done and the same costs incurred 200 times over. This means 200 opportunities to misfile items which may then only be found again by chance.

Books often need to be given three or even more classifications, so a classified collection ends up many times the size of a numerical one. This makes it easy to see why people are loth to assign a second or third classification or sub-division, even if

anything up to 10 might seem justifiable. Retrieval from such collections calls for considerable experience and ingenuity, and even then is ultimately unsatisfactory.

We all know the problem posed by "grey literature", reports, collections of company papers and archiving work. I propose to tell you something about an electronic storage system which in the foreseeable future will radically change all our reference works. Items will then only have to be assigned once, and far greater care can be taken. With classified collections, a monograph for example may be classified in all kinds of subject areas depending on different factors; this considerably increases the likelihood of people finding what they are looking for.

So in future this quest will start not at the book-shelves - as was particularly the custom in Anglo-Saxon libraries - but at the terminal, using computer logic to narrow down the relevant literature for the task in hand. This is a reversion to the system used for centuries in Continental libraries, where subject area was defined by author, title, keyword and classification. This almost purely intellectual exercise was by no means unproductive, which is more than can sometimes be said for computerised techniques: depending on subject and the effort invested, the human intellect gives a retrieval rate of 80-90%, compared with only 20-30% using computerisation.

Apart from textbooks, scientific literaturee is hardly ever read "cover to cover" these days. Frequently, only a single chapter, table or process is of interest.

Reading habits have also changed. Looking at scientific librarianship from this angle, before very long even the storage media - in other words, all the things we used to store in our stacks - will be machine-readable and can be printed out as required.

The only remaining technical problems are drawings and photographs, the idea being to store the material in digital rather than facsimile form and so ensure effective information retrieval even with full-text storage.

This brings me to our example of a continually growing classified collection.

The principle of patents is to grant the inventor a monopoly over use of his idea - which of course must not have already been published elsewhere - for a certain period of time. This monopoly is territorial, being generally awarded for a given nation-state, which however may cede this particular sovereign power to a supranational organisation such as the European Patent Office. It is a trade-off between the inventor on the one hand and his competitors on the other: in return for his monopoly rights the inventor discloses in the patent specification his secret, his invention, his process, the material he has developed, or whatever. This transaction is supervised by the patent offices and governed by the rules of patent legislation.

Typically the librarian's problem is to find out whether anything relating to the subject-matter described in the specification filed has already been published elsewhere, including the earlier specifications which constitute patent literature.

This is neither the time nor place to go into the history of

patent literature, which hitherto has subsisted in virtual obscurity alongside monographs and periodicals. But the number of titles published since patent offices first opened gives some idea of its significance. There are approx. 26 million patent specifications throughout the world, not counting identical ones filed with several patent offices. There are also some 56 patent offices worldwide, only six of which however have a really complete collection of patent specifications. As these are needed for searching new patent applications, they are also known as "search documentation". For all their eagerness to have their own search documentation, most other offices' plans have been thwarted by the problems involved in building up classified collections.

There is in fact an equation: countries with a highly-developed library sytem - the USA, Great Britain, the Netherlands, the Soviet Union, Japan and Germany - also have good classified collections of patent specifications; all the other countries now trying hard to develop their libraries are also compiling - with varying degrees of success - comprehensive classified collections of patent specifications. Not because they have been told to, but probably more as a subconscious reaction on the part of those involved.

But let me return now to the classified collections which have to searched to establish whether an invention is really new. One could imagine all those 26 million specifications collected and classified using a uniform system, which indeed already exists in the form of the International Patent Classification (IPC); each title would of course have not just a main class but two to four sub-classes as well. This would mean 78 million patent specifications in paper form, taking up 120 km of shelf space and at current rates likely to grow by another 72 km or so by the year 2 000. This is on the scale of a medium-sized national library; even experienced librarians can scarcely conceive of the storage capacity required.

And so far I have only been talking about the applications. The number of granted patents is about half as many again. Patent offices also have to store bulky files on each application for at least 20 years.

However meticulously maintained, collections on this scale eventually become unmanageable and the search no longer reliable. After all, every inventor wants to know as quickly as possible whether his invention is really new, or in other words what his chances are of being granted a patent.

Nor of course can these collections any longer be made publicly available; searches by individuals have as a result long been impossible, despite the fact that patent literature represents a largely unexploited source of new ideas. I discussed this topic in my paper published INSPEL, VOl. 19, 1985. Another problem with classified collections of this size is the classification system itself, which can no longer keep up with the pace of technological and scientific advance. Nor are we allowed the specialist staff needed; examiners are given this vital job as a special duty. There is no really consistent line, as there is for example with decimal classification.

In such circumstances, new techniques to manage all this information are clearly of the essence, but I have to admit that I consider "portable" database systems such as CD-ROM to be a stop-gap which will be superseded once broadband cabling is sufficiently developed to allow them to be replaced by vast central memories.

Experiments with optical disks, whether at Pergamon, in Japan or at the EPO, have been or are being abandoned. The equipment is too expensive compared to CD-ROM drives, which use standard

audio-drives with modified circuitry. Access via juke-boxes is relatively slow; the disk must be centred and rotated at speed. It will be appreciated that here the mass of information in motion is a decision criterion. The drives are now so cheap that with some memories each CD-ROM can have its own reader; these are reliable and, if they ever do go wrong, can simply be removed and replaced. Maintenance of mechanical parts, and the risk of having the entire system go down for a long periods, are further reasons for opting for solutions in which the data on the disk is only unavailable for a few minutes.

A single CD-ROM holds something like the patent applications published in one week - i.e. about 500 to 700 averaging 10 pages each - plus the codes needed to access them.

Access to patent specifications has to be possible, but also by other criteria less usual in library catalogues. Let's start with the author, or in our case the inventor. This however is not the owner of the invention; usually he works for someone else. The proprietor is the applicant, who can broadly be compared with the publisher owning the rights to a particular work. The function of the patent agent is one already familiar from the literary world; for a commission he finds the poor author a publisher. This however is really neither here nor there from the bibliographic point of view.

There are also searchable data such as the priorities claimed and, at the EPO, the Contracting States designated, as well as application and publication numbers.

For us librarians, the main thing is the search by subject-matter. In addition to classification, indexing in the three official languages can also be used for retrieval. Up till now this has involved keywords from the title, but with growing digitisation the descriptors will come from the specification's full text. This will greatly improve retrieval - after all, no title really says enough. It will then be possible to call up the list of descriptors and narrow down the search using "and"/"or" combinations.

Traditionally, subject-heading and classification laid the groundwork for retrieval, but with computerised searching systems retrieval is now a matter for the user himself, either unaided or with assistance.

Our own system is called ESPACE. At present it only permits searches of the applications filed in a given week. However, to cover longer periods we have developed the FIRST system; using the same search strategy it gives cumulative figures for the quarter, half-year and year, as do national bibliographies.

In the foreseeable future, juke-boxes used in conjuction with a given program will make possible automatic searches in a particular subject. In addition to European applications, WIPO (World Intellectual Property Organization) international applications have also been stored on CD-ROM since the beginning of the year, and one may assume that EPO Contracting States will adopt the same system for their own publications, if only to be able to use the same equipment and software for searching and monitoring purposes.

The patent family system is a comprehensive reference system enabling each application to be traced back to the original filing. The would-be patent literature user can then have the specification printed out in a language he knows. In small and medium-sized firms, particularly many small businesses and workshops, lack of language knowledge is probably one of the main reasons (along with access difficulties) why patent literature is so little used.

Patent literature was hitherto accessible to a select few specialists familiar with the often complicated retrieval techniques. Electronic memories mean it can now be tapped not only by big firms with their own specialist documentation; it also offers small and medium-sized firms all over the world - and irrespective of their proximity to a major patent office - the possibility of using other people's inventions for their own benefit as participants in the "market of ideas".

IFLA GENERAL CONFERENCE STOCKHOLM 1990

Division: Special Libraries

Section/RT: Social Science Libraries

106-SOC-3-E

The Information and Library Environment and the Productivity of Research

by

Michael E. D. Koenig
Graduate School of Library and Information Science
and Graduate School of Business
Rosary College, River Forest, Illinois 60305
U.S.A.

Keywords:
Productivity
Information Environment
Library Services

For internal use only:
Meeting No: 91
CII: ~~yes~~/no

The Information and Library Environment and the Productivity of Research

Michael E. D. Koenig

Abstract

This paper presents the preliminary results of a study which attempts to elucidate the relationship between the research productivity of pharmaceutical companies and the library and information environment of those companies.

The library and information environment of the four most highly productive U.S. based pharmaceutical companies was compared with that of the four least productive companies of comparable size (in terms of R & D budgets). The output measure for the productivity calculations was the number of good new drugs developed. The input measure was the R & D budget. The more productive companies group was on average 3.5 times as productive as the less productive group.

The more productive companies were found to be characterized by:

- Greater openness to outside information.
- Rather less concern with protecting proprietary information.
- Greater end user use of information systems and more encouragement of browsing and serendipity.
- Greater technical and subject sophistication of the information services staff.
- Relative unobstrusiveness of managerial structure and status indicators in the R & D environment.

The Information and Library Environment and the Productivity of Research

Background

Presented here are the preliminary results of a study of the relationship between the productivity of pharmaceutical research, and the library and information environment of the companies conducting the research.

We librarians and information officers are all in the business of running libraries and information centers to make the organizations we support more productive, whether that is pharmaceutical researchers, or faculty, or students, or the body public. Yet, we know very little about the relationship of the services we provide and the information environments we create, with the productivity of the organizations and individuals we support (BLAGDEN, KOENIG 1990). The principal problem of elucidating that relationship is that it is very difficult to measure productivity, particularly of the persons supported by libraries and information centers. The people who are supported by libraries and information centers are knowledge workers, and it is notoriously difficult to measure the productivity of knowledge workers.

However the research component of the pharmaceutical industry represents a nearly unique opportunity to analyze knowledge worker productivity. The pharmaceutical industry is a relatively unconcentrated industry characterized by many competitors, it is manifestly information dependent, and it has a research output that is quantifiable and relatively commensurable, the new therapeutic agent (drug). The rigor of the Food and Drug Administration (FDA) new drug approval (NDA) process ensures that therapeutic agents are not submitted for approval lightly. A gross measure of productivity can be calculated simply as the number of approved new drugs per dollar of research expenditure. That output measure can be further refined by weighting it in regard to 1) whether or not the FDA regards the drug as an important therapeutic advance 2) the drug's chemical novelty, and 3) the filing company's patent position with regard to the drug, an indicator of where the bulk of the research was done. Productivity among large pharmaceutical companies, as measured by this metric, differs quite dramatically (KOENIG 1983).

Productivity data was calculated for twenty-four major pharmaceutical companies who do the bulk of their research in the U.S. (The study is limited to U.S. companies primarily to avoid the very complex problem of trying to analyze how much research a U.S. dollar versus a Swiss franc versus a Dutch guilder, etc. buys over a period of many years.)

The basic measure of pharmaceutical company research output was the number of NDAs approved by the FDA for each company during the years 1965-1983. While the approved NDA is by no means a perfect measure of research output, it does indeed have a high degree of intuitive validity. As the phrase in the pharmaceutical industry has it "the NDA is the name of the game." From the point of view of the pharmaceutical company, its R & D effort is pointless if no approvable NDAs emerge.

This measure is refined in three ways. First, only those NDAs that are new chemical entities are considered. Medical devices, combination products, new uses of an existing compound and minor molecular mmodifications are excluded. The rationale for this distinctions is that it reasonably reflects the distinction between NDAs that represent original research and those which are generally derivative.

Second, those drugs on which the company enjoys patent protection are weighted more heavily, on a ratio of 2 to 1, than those drugs without such protection. The rationale for this is that if a pharmaceutical company has done the development work on a compound, it will generally enjoy patent protection. If it has not done the developmental work, it will typically not enjoy patent protection. In those cases, the patent may have been assigned to the company from whom the patent was licensed, or the discovery may have originated in the open literatue. The patent position then is an indicator of how much of the R & D process was undertaken by the company.

Third, the drugs are weighted by medical importance. This weighting is based on an internal FDA study which classifies drugs as to therapeutic potential. Those drugs regarded by the FDA as being particularly important are classified as "Important Therapeutic Gains." Such drugs, ITGs, are weighted in this study in a ratio of 2 1/2 to 1 to non-ITGs, this ratio being derived simply from the inverse of the relative proportion of ITGs to non-ITGS.

These refinements and weightings resulted in a component drug output score, and four constituent components. Those components are: Important Therapeutic Gain drugs with company patent positions (ITG,P), Important Therapeutic Gain drugs without company patent positions (ITG,WP)) Modest Therapeutic Gain drugs with company patent positions (MTG,P), and Modest Therapeutic Gain drugs without company patent positions MTG,WP. The composite drug output can be expressed as : Score = (5 X ITG,P) + (2.5 X ITG,WP) + (2 X MTG,P) + (1 X MTG,WP).

The basic measure of pharmaceutical company research input was the R & D budget for the years 1965-1978. (The availability of such data was also one of the reasons for

limiting the analysis to companies in the U.S.; financial reporting requirements in most other countries are typically much less rigorous, not requiring sectoral break outs by line of business.)

There is an extensive literature on "drug lag" relating to the length of time between when the basic research is done and when the drug is approved (LASAGNA; WARDELL & SCHECK). This lag is generally regarded to be on the order of seven years. In any case, both pharmaceutical company performance as defined here and their R & D expenditures tend to be quite stable over time (Koenig, 1983).

The data for the two classes of companies is as follows:

The Four Most Productive Pharmaceutical Companies

Company	Productivity	Score	Yearly R&D Budget
Pfizer	16.1	84	52.3
Upjohn	15.7	90	57.3
Schering	12.8	40.5	31.6
Bristol	12.6	32.5	25.6

Average Productivity=14.3 Average R & D Budget = 41.7

The Four Least Productive Pharmaceutical Companies of Comparable Size

Company	Productivity	Score	Yearly R&D BudgeT
Lilly	5.5	42.5	76.7
Smith Kline	4.3	17.5	40.8
Wyeth	4.2	11	26
Searle	2.3	8	33.8

Average Productivity=4.1 Average R & D Budget = 44.3

Between Group Productivity Ratio = 3.5 to 1

Note that the companies are very similar in size (the average yearly budgets for the two groups differ by only 6%), yet the difference in average productivity between the two groups is dramatic, the ratio between the more successful group and the less successful group is 3.5 to 1, a 250% percent

difference. Even the lowest of the most productive group is more than twice as productive (2.3 to 1) as the highest of the least productive group.

The information environment is being analyzed in two fashions. First a rather detailed questionnaire has been sent to researchers in the twenty-four companies, seeking information about their information environment and practices as they individually perceive the situation. Second focused interviews are being conducted with librarians and information officers in the pharmaceutical companies.

The results reported here are preliminary. The data is only partially analyzed at this point, and a more detailed report will be submitted for publication in the near future. The major findings to date are set out below.

FINDINGS:

Greater Openness to Outside Information

The more productive companies enjoyed an environment that was more open to outside information. Researchers at the more successful companies attended more external meetings per year and agreed more strongly with the following statements:

In general my company encourages me and others to keep current in our fields.

My project leader(s) in particular encourage me to keep current in my field.

Management agrees that a primary function of conferences meetings, etc. is the exchange of information, and that is a net plus to our organization.

My company encourages involvement in professional activities such as meeting presentations, journal article authorship, holding office in professional societies, etc.

My organization encourages me to seek information beyond my immediate needs.

The single greatest discriminator in this area was the following statement:

I am encouraged to seek work related information from colleagues in other organizations.

Researchers from the more productive companies tended on the whole to agree with it, while researchers from the less productive companies tended to disagree with it. It should be noted also however that this question was characterized by

a particularly high degree of intra company disagreement. This may indicate micro climates within a company information environment.

Rather Less Concern with Proprietary Data

The more successful companies were relatively less concerned about protecting proprietary data. That is not to say of course that they were not concerned with the protection of proprietary data. All companies studied had a policy of permitting conventional journal publication of key information only after a patent application had been made and the patent had appeared in the open literature. From that point on however, researchers at the more productive companies perceived their companies as being above average in encouraging publication, while researchers at the less productive companies had precisely the opposite perception of their companies. Additionally, researchers at the more productive companies perceived their companies as being fairly typical in their concern for protecting proprietary information, while researchers at the less productive companies perceived their companies as being well above average in their concern for protecting proprietary data.

Note also the very different response to the last statement mentioned in the section above. The researchers at the more successful companies tended to agree that they were encouraged to seek work related information from colleagues in other organizations, while the researchers at the less successful companies tended to disagree. The fit with concern about proprietary data is obvious. Communications is a two-way street. Organizations that are more concerned about protecting their proprietary data are quite logically less likely to encourage communications on work-related matters with colleagues in other organizations, many of whom will of course by competitors.

Greater Information Systems Development Effort

In the more succesful companies, the library/information center staff devoted a greater percentage of their time to the development of information systems, and the systems development efforts underway at the more successful companies tended to be at a higher level of sophistication than at the less successful companies. The more successful companies were more likely to have pursued their own development efforts in areas such as structure-activity relationship systems, synthetic chemical pathway systems, three dimensional graphical representation/manipulation systems, etc., rather than simply using systems developed elsewhere. While the successful companies are no less likely to use systems developed elsewhere including commercially available systems, they are more likely to have added their own enhancements. Finally, the more successful companies are more likely to report that they are or are likely to experiment with expert

systems applications than are less successful companies.

Greater End-User Use of Information Systems and More Encouragement of Browsing and Serendipity

The more productive companies tended to encourage greater end user involvement in information seeking and information system use. The researchers themselves in the more successful companies more often reported that they or members of their research team used the library and used online information systems directly rather than asking the library information center staff to undertake a search for them. Also, they were more likely to report use of the library/information center for browsing purposes.

To generalize--the successful companies tended to have a corporate research culture that encouraged the researchers to spend time in the library or information center and to browse information sources themselves, while the less productive companies tended to have a corporate research culture that encouraged the researcher to spend his or her time at the bench and call for information from the library or information center when needed. The distinctions were of course not so black and white, but one observation is telling. One of the two most productive companies has a system of displaying current journals on two large tables, one prominently labelled "Today's Journals" and the other "Yesterday's Journals." The message conveyed in that corporate culture is quite clear; the researcher is expected to scan the current literature frequently, and a frequency of at least every other day is not overdoing it.

Greater Technical and Subject Sophistication of the Library/Information Center Staff

In the more successful companies, the professional staff of the library/information center are more likely to have higher degrees as well as being more likely to have subject specific degrees, most often advanced degrees in chemistry. Intriguingly however there appears to be a tendency for the managers of the technical/scientific information sections in the more successful companies to have professional training in library or information science as well as subject background, as opposed to scientific training only. The number of cases is so modest however, that the degree of statistical confidence in this finding is very low, and therefore we report it not as a finding but as an intriguing artefact.

The findings here appear to mesh with those above. That is, the more successful companies have an information style in which the researcher or his or her team members do the routine literature search work themselves and turn to the library/information center staff for their non routine and more sophisticated needs, such as complex sub-structure

searching, patent searching etc. This approach requires a greater concentration of high level technical and subject skills among the professional staff of the library/information center.

Relative Unobtrusiveness of Managerial Structure and Status Indicators in the R & D Environment

When asked to rate their companies against others in the same industry, researchers from the successful companies were more likely to agree with:

> The social style of the research component of my company is relatively egalitarian compared to other companies.

and less likely to agree with:

> Status indicators in this company are relatively unsubtle as compared with comparable companies.

than were the researchers in less successful companies. In directed interviews with senior professional library/ information center staff, the researcher perceived a clear qualitative difference in style between the more and less successful companies. There appeared to be a more open - egalitarian style in the more successful companies. This finding is largely impressionistic (but will be followed up by further work). One illustrative example is that at their research headquarters two of the four less successful companies had either a separate food servie or a separate menu for management, while none of the four most successful companies did.

DISCUSSION OF FINDINGS

The finding of "Greater Openness to Outside Information" is hardly novel. It is consistent with an extensive body of literature over the last quarter century commencing with the seminal work of ALLEN (1964, 1969, 1977). Other key papers are those by PELZ & ANDREWS, ALBRECHT & RAPP, ORPEN, GOLDHAR ET AL, TUSHMAN, UTTERBACH, MCCONNWELL, KANTER (1987, 1983), and WOLEK & GRIFFITH.

The other findings are entirely consistent with the body of literature above, but tend to be more particular and specific. The findings of MONDSCHEIN that scientists who use an automated alerting service frequently, tend to be more productive than their colleagues who do not use the service or who use it infrequently, and that they were characterized by their attempts to keep abreast, in particular seem congruent with the findings here concerning encouragement of browsing and serendipity.

INTERPRETATION (CAVEAT)

One must be careful in interpreting these findings. As is so often repeated, correlation is not causality. Differentials in research productivity and differentials in the research environment may both be a function of some third factor. It might for example be the case that some companies manage to hire significantly more brilliant researchers, and that more brilliant researchers produce more successful research and that they also demand or create a different information environment. Or, it might be that causality flows not from more sophisticated information systems development efforts to more successful research, but rather that success in research prompts management to look more kindly upon information system development efforts. Nonetheless, the relationships are highly suggestive and warrant further investigation.

BIBLIOGRAPHY

ALBRECHT, TERRANCE L.; ROPP, VICKIE A. 1984. Communicating About Innovation in Networks of Three U.S. Organizations. Journal of Communication. 1984 Summer; 34(3): 78-91. ISSN: 0021-9916.

ALLEN, THOMAS J. 1964. The Utilization of Information Sources During R & D Proposal Preparation. Cambridge, MA: MIT Press; 1964. 31p. (MIT Alfred P. Sloan School of Management working paper no. 97-64). OCLC: 14366743.

ALLEN, THOMAS J. 1969. Information Needs and Uses. In: Cuadra, Carlos A.; Luke, Ann W., eds. Annual Review of Information Science and Technology: Volume 4. Chicago, IL: William Benton; 1969. 1-29. ISSN: 0066-4200; ISBN: 0-85229-147-7.

ALLEN, THOMAS J. 1977. Managing the Flow of Technology: Technology Transfer and the Dissemination of Technological Information Within the R & D Organization. Cambridge, MA: MIT Press; 1977. 320p. ISBN: 0-262-01048-8; LC: 76-57670.

BLAGDEN, JOHN F. 1980. Libraries and Corporate Performance: The Elusive Connection. In: Taylor, Peter J., ed. New Trends in Documentation and Information: Proceedings of the Federation Internationale de Documentation (FID) 39th Congress; 1978 September 25-28; Edinburgh, Scotland. London, England: Aslib for FID; 1980. 379-382. ISBN: 0-85142-128-8; LC; 81-1085618.

BORKO, HAROLD. 1983. Information and Knowledge Worker Productivity. Information Processing & Management. 1983; 19(4): 203-212. ISSN: 0306-4573.

GOLDHAR, JOEL D.; BRAGAW, LOUIS K.; SCHWARTZ, JULES J. 1976. Information Flows, Management Styles, and Technological Innovation. IEEE Transactions on Engineering Management. 1976 February; EM-23(1): 51-61. ISSN: 0018-9391.

KANTER, ROSABETH MOSS. 1982. The Middle Manager as Innovator. Harvard Business Review. 1982 July/August; 60(4): 95-105. ISSN: 0017-8012.

KANTER, ROSABETH MOSS. 1983. The Change Masters: Innovation for Productivity in the American Corporation. New York, NY: Simon and Schuster; 1983. 432p. ISBN: 0-671-42802-0; LC 83-4781.

KOENIG, MICHAEL E. D. 1983. A Bibliometric Analysis of Pharmaceutical Research. Research Policy. 1983 February; 12(1): 15-36. ISSN: 0048-7333.

KOENIG, MICHAEL E. D. 1990. Information Services and Downstream Productivity. To appear in: Williams, Martha E., ed. Annual Review of Information Science and Technology: Volume 25. Amsterdam, The Netherlands: Elsevier Science Publishers B. V. for the American Society for Information Science; 1990 (In press). ISSN: 0066-4200. Preprint available from: the author, Rosary College, Graduate School of Library and Information Science, 7900 W. Division Street, River Forest, Illinois 60305, U.S.A.

KOENIG, MICHAEL E. D.; GANS, DANIEL J. 1975. The Productivity of Research Effort in the U.S. Pharmaceutical Industry. Research Policy. 1975 October; 4(4): 331-349. ISSN: 0048-7333.

LASAGNA, LOUIS, ed. 1980. Controversies in Therapeutics. Philadelphia, PA: W. B. Saunders; 1980. 603p. ISBN: 0-7216-5653-6.

MCCONNELL, J. DOUGLAS. 1980. Productivity Improvement in Research and Development and Engineering in the United States. Society of Research Administrators Journal. 1980 Fall; 12 (2): 5-14. ISSN: 0038-0024.

MONDSCHEIN, LAWRENCE G. 1988. R and D Productivity: Relationship to Selective Dissemination of Information (SDI) in the Corporate Environment. New Brunswick, NJ: Rutgers University; 1988. 320p. (Ph.D. Dissertation). Available from: University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48106. (UMI order no. AAD89-01101).

ORPEN, CHRISTOPHER. 1985. The Effect of Managerial Distribution of Scientific and Technical Information on Company Performance. R & D Management. 1985 October; 15(4): 305-308. ISSN: 0033-6807.

PELZ, DONALD C.; ANDREWS, FRANK M. 1969. Diversity in Research. In: Allison, David, ed. The R & D Game: Technical Men, Technical Managers, and Research Productivity. Cambridge, MA: MIT Press; 1969. 73-89. LC: 68-27422.

TUSHMAN, MICHAEL L. 1979. Impacts of Perceived Environmental Variability on Patterns of Work Related Communication. Academy of Management Journal. 1979

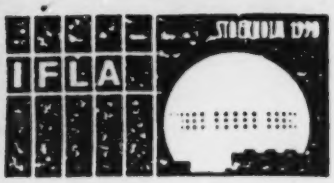
September; 22(3): 482-500. ISSN: 0001-4273.

UTTERBACK, JAMES MILO. 1974. Innovation in Industry and the Diffusion of Technology. Science. 1974 February 15; 183(4125): 620-626. ISSN: 0036-8075.

WARDELL, WILLIAM M.; SCHECK, LORRAINE E. 1983. Is Pharmaceutical Innovation Declining?: Interpreting Measures of Pharmaceutical Innovation and Regulatory Impact in the USA, 1950-1980. Rational Drug Therapy. 1983 January; 17(1): 1-7. ISSN: 0031-7020.

WOLEK, FRANCIS W; GRIFFITH, BELVER C. 1974. Policy and Informal Communications in Applied Science and Technology. Science Studies. 1974 July; 4(4): 411-420. ISSN: 0036-8539.

IFLA GENERAL CONFERENCE STOCKHOLM 1990



Division:

Special Libraries
Section/RT: WORKSHOP
Social Science Libraries

107-SOC(WS)-4-E

Workshop
New Development in Document Delivery
The Social Sciences

The Online Document Ordering Network for Libraries in the FRG - The Share of the National Library of Economics -

By

Ekkehart SEUSING

Bibliothek des Instituts für Weltwirtschaft
an der Universität Kiel
National Library of Economics in the FRG
Kiel (Federal Republic of Germany)

For internal use only:

Meeting No: 105

SI: ~~yes~~/no

Abstract

The Serials Database, a union list of serials in Germany, provides an online document ordering module. The basis for this system and the task of the National Library of Economics within this system is delineated. The users' structure, the subjects of requested articles, the date as well a the country of publication of the articles are presented and discussed. The performance of this service is examined by hand of generally accepted requirements for an online document ordering system.

Introduction

More than twenty years ago the online revolution started. In that time, interactive access to databases has become almost commonplace for librarianship in university and industry.

Twenty years ago it was generally assumed that traditional interlending between libraries, aided by union catalogs, would meet most needs.

The now highly developed technology that supports the online database industry as well as the increasing scale and importance of document supply made it possible to introduce e.g. an online ordering system for serials databases.

This paper gives an impression of the importance of the Serials Database - Zeitschriftendatenbank (ZDB) - a union list of serials administrated by the German Library Institute, and combined with an online ordering document supply system.

Some information on the database and the online system opens the paper. The task of the National Library of Economics (NLE) in the FRG within this system is delineated. It is followed by an empirical analysis for the years 1988 and 1989 on the user structure, the subject structure of the requested articles, the date as well as the country of publication of the articles. Some of this data is reviewed and the performance of the service is examined by hand of generally accepted requirements for an online document ordering system.

Background

Before proceeding to the main theme of my paper I feel that I should give you a little background information about the Zentralbibliothek der Wirtschaftswissenschaften in der Bundesrepublik Deutschland (National Library of Economics in the Federal Republic of Germany).
In 1966, this function was transferred to the Library of the Kiel Institute of World Economics, one of the leading institutes of economic research in Germany. Since its establishment in 1914, the Library has developed into one of the largest and most famous libraries for economic literature in the world. As a central subject library it has the nationwide function to collect, classify, index, and lend economic publications from all countries and in all languages to its national and international users[1].

The following indicators for 1989 should give some statistical information about the importance of the Library[2]. The holdings amount to more than 2.1 million

volumes. 19.200 journals and annual publications are processed per year. Articles of roughly 2.000 journals are regularly indexed, 110 of them from cover to cover. In 1986 the Library established its own database ECONIS (Economics Information System). At the end of May 1990, the user could refer in ECONIS to 266.762 titles including 98.545 monographs, 87.523 articles in journals and 14.178 articles in composite works (conference volumes, Festschriften).

Interlibrary loan

Interlibrary loan (ILL) is a very prominent, heavily used service in German libraries. Since the end of the nineteenth century the decentralized system of library provision has made interlending inevitable. The regional and cultural diversity as well as the political history impress on the present library system. Jurisdictionally there are eleven states in the FRG and education as well as culture (including libraries) fall under the responsability of the states. This caused problems for users and frustration for staff, especially when they were searching for articles in journals. In contrast to the highly centralized interlending system in the UK, a more diversified system has developed in the FRG.

To improve the ILL, the Deutsche Forschungsgemeinschaft (German Research Council) financed and organized the Serials Database in cooperation with the Staatsbibliothek Preußischer Kulturbesitz (SBPK). It started in 1971. Today the Serials Database is managed by the SBPK and the Deutsches Bibliotheksinstitut (German Library Institute) containing over 530.000 periodical holdings contributed by more than sixty suppliers. The database offers the listings of titles and bibliographical datas of journals as well as annual publications. It comprises titles of periodicals published worldwide from all fields of interest, the holdings locations from libraries in the FRG, and the individual call numbers[3].
This system, based upon online links to bibliographic and serials holdings information, automatically routes interlibrary loan request to potential lenders. At present there are six suppliers of the online document ordering. Besides the SBPK and the Bayerische Staatsbibliothek the four German central subject libraries cooperate within this system: TIB - Technische Informationsbibliothek (Hannover), Zentralbibliothek der Landbauwissenschaft (Bonn), Zentralbibliothek der Medizin (Köln), and the Zentralbibliothek der Wirtschaftswissenschaften.

Work flow

The Serials Database is a bibliographical database. The online access is possible on a national and international basis with terminals via the packet-switching-network DATEX-P of the German Postal Authorities. The development of this bibliographic online service brought an improvement in the supply of information. On the other hand the acquisition of documents which had been identified by a retrieval run and which are not available in the users' library was still a problem. The creation of an online ordering system and its link with the Serials Database made it possible to improve the document delivery for articles in journals.

In the course of an online search in the bibliographical database the user identifies the journal of which he wants to order an article, preferably without repeating the bibliographic elements for placing the order. The system offers a list of the holdings locations of the libraries which participate in the online ordering. The user can now decide which library he will ask for the copy. For completing the order he has to give in the name of the author, the title, the publication date, the volume, the issue, and the pages. Thereafter he has to mark "urgent: yes" or "urgent: no" for a rush-order resp. for a regular order. Having finished these procedures the request is stored in the order file of the database.

Up to this point we have only looked to the order procedures. Which effects does the introduction of such a system have on the suppliers' side?
At first it was necessary to introduce an additional office routine within the ILL. Once a day (early in the morning) the stored orders from the day before are called for via DATEX-P. The photocopies of rush-orders are delivered the same day by mail; the regular orders are processed within a weeks' time.
The photocopies are not delivered free of charge. Therefore an additional activity of the library staff has to be organized: to bill the client. To control the payment of the bills and to send reminders if necessary is another supplement activity. A regular order is charged with DM 10,- for an article with no more than twenty pages; for additional pages the client has to pay DM 0,50 per page. Rush-orders cause a surcharge of fifty percent. For orders from abroad the unit price is different from that of the inland selling price. If the request is not filled there will be no charge for the client. He will receive a short notice giving him some information why his order cannot be fulfilled (such as not on shelf or at bindery).
Because of the specific requirements for arranging the document delivery system it was necessary to introduce

an additional office routine, especially to handle the rush-orders. They cause a lot of additional work, e.g. many issues are lent to clients in the Institute's research departments and for fulfilling the order on the same day someone has to go and to ask for the publication. The twofold functions of the NLE, i.e. to be the library of a research institute and - at the same time - to be the "lender of last resort" with a nationwide function, cause this special problem, since for budgetary restrictions there exists only one copy per journal. The issues of many important journals are routed in the research departments. Often the same journals are in demand for the online ordering network. As a result of all this extra workload it is necessary to have income from the online ordering activities. It must be emphasized that the traditional ILL services of the NLE are free of charge.

The active part of the NLE

One of the goals of the NLE is to provide economic professionals and research scientists with timely access to information and documents. To accomplish this goal, the NLE has been a supplier in the online ordering network since the end of 1987. Its share is quite low in comparison to the other partners in this document supply system; less than 2 percent of all orders in the first half of 1989 were deliverd by the NLE. This is the lowest rank of all suppliers. One reason may be that the NLE started its participation later than most of the other libraries. Since the beginning of this year the growth rate of incoming orders has been higher than 50 percent. The evaluation of the annual statistics of the Serials Database shows that more than two thirds of all orders are sent to the central subject library of medicine and to the TIB, i.e. the majority of clients is interested in medicine, pharmaceutical research, biology, science, and technical questions. The social sciences and humanities do not find the main interest of clients using the Serials Database.
This seems to be the typical structure of demand as it is shown by other studies. A survey of the use of the loan/photocopy service of the British Library Document Supply Center shows that the demand in science and technology is greater than that of the social sciences (91 percent resp. 5 percent in 1984)[4]. A comparison of national library statistics shows that science and technology libraries are the main suppliers of interlibrary loans and copies: "The reasons for this demand are to be found in the research and development effort which is concentrated in the business enterprise sector"[5], a sector which is able to spend much money for its research efforts. Whereas the clients of libraries in the field of social sciences or economics are concentrated in the sphere of universities and its

research institutes, an environment that is usually short of money for information and document supply. Another point is the argument that its research in general is not under such a pressure of time like in industry. For researchers in universities or for students the online ordering seems to be very expensive. Only few clients are prepared to pay a charge for an economy of time.

Empirical analysis

The datas of 1988 and 1989 give complete information per year on the online document ordering, because the NLE has been a supplier only since the end of 1987.
From 1988 to 1989 the number of orders increased at a rate of 40 percent to 476 orders; approximately 21 percent had been rush-orders.
In 1988 2 percent of all orders had been unsettled; in 1989 this percentage rate increased up to 16 percent. This high increase was caused by special developments: many orders with incomplete bibliograhic descriptions and a bottleneck in the in-house bindery. The first problem could be solved by an individual user education. It should be kept in mind that the Serials Database gives bibliographic descriptions only for periodicals and not for articles in them. But in many sources and footnotes, which are the starting points for orders, the citations are very incomplete or even incorrect and thus cause much additional workload of the library's staff for identifying the requested article.
The second problem could be solved by a reorganization of the bindery. The success of these measures is proved by the high fill rate of 95 percent in the first six months in 1990.

In 1989 37 different clients from five European countries used the online ordering system of the NLE. The largest user group consists of industrial libraries (table 1). A group that needs information without any delay and that is prepared to pay for an express service. The second largest group consists of clients in research institutes - the traditional users of the NLE. This group doubled its orders from 1988 to 1989; such a development could be explained by the fact that these libraries may be more and more familiar with the new techniques as well as services and that they now start to raise funds for information activities. The third important group constitutes management consultant firms. They need their information in a very short time because their work is project orientated and their own libraries are not large enough to cover all aspects for their fields of activity.
Two smaller groups form university and administrative libraries with both less than 4 percent of all orders in 1989.

To sum up, almost two thirds of all orders are from business orientated users (industrial libraries and management consultant firms) whereas the other third results from clients in an university environment (research institutes and university libraries). Comparing the two years under review it can be stated that the percentage rate of the business orientated users decreased, whereas the orders from clients in the university environment increased at just the same rate.

This shift is - in a slightly moderate way - reflected by the fields of interest of the users (table 2). In the beginning the demand for literature in business administration was higher than for publications in economics. In 1989 both subjects came to a share of one third for all requests. The third largest subject (articles on selected goods) is mainly asked for by industrial libraries; but their share decreased from 27 to 15 percent. Journals like "European Chemical Market" or "Oil and Gas Journal" are filed under this heading. Such a development is another proof for the shift from business orientated information to articles for university research.
Under the heading "others" articles can be found from journals like "Computer Software" or "Journal of Information Science" as well as journals reporting on agricultural or political questions, subjects that are not in the center of interest for the NLE.

A precise analysis of the online orders points out that the clients are very much interested in the most recent publications (table 3). Approximately two thirds of all orders concern articles published from 1985 onwards. Roughly 14 percent of all articles ordered in 1988 had been just published in that year; in 1989 the percentage rate was even higher (16 percent). It can be said that most journals have a short life-span, i.e. it is only the latest volumes which are in demand. This interest in the most recent publication means an additional search for the staff, because the issues are still in the cataloging department for indexing, routed in the research deparments, or in the in-house bindery. Nevertheless, the part of older publications is astonishingly high with almost 10 percent for articles published prior to 1960.

Furthermore the evaluating of the requests by countries of publication is quite interesting (table 4). The publications from the FRG have - with a decreasing trend - the largest share, closely followed by publications from the USA. Altogether, the journals of both countries, include more than 60 percent of all articles. This is not very surprising because the most important articles for German economists are published in one of these states. Another German speaking country (Switzerland) follows with more than 7 percent. Journals

from the UK and the Netherlands (a country in which many journals only publish articles written in English especially by US-Americans) are also in demand for the online ordering service. This clearly shows that the demand is mainly concentrated on publications in two languages (German,English) and on those countries in which the publishing business refers on these languages.

Requirements of a national online ordering system

In this chapter it will be discussed whether the NLE can perform the clients' demands.
One precondition of an effective service is a comprehensive acquisition policy and a comparative complete collection that are able to fulfil all user demands. Under the reservation that it is impossible for any library to have a complete collection, and that it is extremely ineffecient to acquire the last five percent of journals that are missed in a library, it can be said that the collection of the NLE is quite complete. This is proved by the high satisfaction rates reported above.
It should be mentioned that it is possible - within the online ordering system - to request articles from journals that are not recorded in the Serials Database. In the past only few journals had been asked under these conditions and they were not pertinent to the subject area of the NLE.

The volume of demand[6] is another measure for the success of the system. Up to now the NLE has attracted very little demand in comparison to the other suppliers, but in future it will substantially grow as the growth rates are higher than 50 percent in the first half of the running year. It should also be remembered that the market for literature in economics and business administration is obviously smaller than for sciences as shown above.
The fast supply is another requirement. In 1989, 109 requests had been rush-orders that had to be delivered the same day by mail. For another 41 orders the clients asked for delivery by facsimile transmission although this extra service is only executed by an additional charge. This means that more than 30 percent of all requests had been in urgent demand for the user. The NLE could handle this high percentage rate of express orders without any problems. As mentioned above the users have to pay an extra charge for their rush-orders, which are manpower-intensive, because an extra service is necessary for each order. Such a service causes additional costs which are in the case of facsimile transmission extremely high.
Further substantial requirements are the ease of use and the ability of the system to be responsive to changing needs. In the given context these points should not be

discussed because the host of the Serials Database is not the NLE but the German Library Institute. Looking at the success and growth of the Serials Database in general it can be presumed that these requirements had been fulfilled as seen by the users.

Charles Oppenheim puts the strong points of his arguments on the demand side[7]. Amongst his conclusions there are some arguments that should be considered when evaluating the share of the NLE in the online ordering environment.
The service should be the first or only in the market-place. A condition that is met by the NLE because of its function as a national central library for a special subject field.
Very important is a fast and accurate service which is provided by the NLE as shown above. Furthermore the service should deliver information people need for decision-making, i.e. not lists of references but selective information, and the service should be offered in high profit areas where users can pass on the costs to their own clients in turn. Both points are fulfilled by the NLE because only that article is delivered the user asks for. The main customers are industrial libraries and management consultant firms, users that can directly or indirectly pass on the information costs to their clients. In a way researchers pass on their costs, too, when paying the information from the university budget.

One weak point in the performance of the online ordering system is the absence of effective marketing. The only marketing is done by the host, the German Library Institute. But there should be a marketing strategy by the NLE aimed exactly at their specific clients in industry and university. The Library has not yet exhausted its reserves and an effective marketing can help to inform all interested clients. In that field many activities still have to be done.

Conclusion

In this time when information is proliferating and information technology is rapidly developing, no library can afford to operate in isolation. The German Library Institute manages the comprehensive Serials Database with a network of libraries combined in an online document delivery system. The acceptance of such a system was proved by the example of the NLE.

The orders given to the Library grew during the period under review by more than 40 percent per year. But one should keep in mind that the starting point lay very low. That is a typical observation for bibliographical databases in the field of economics. In comparison to

technical or science libraries the usage frequency is quite low. The main users of the NLE online ordering system are private enterprises and staff from research institutes. The orders are concentrated on few clients. This might be an indicator for a neglected marketing strategy. To raise the number of requests it will be necessary to give the service publicity. The quality of the information service is much more important than the price. The service should be fast and accurate and answer the clients' immediate needs.

The future prospects of the share of the NLE within the online ordering network will also depend on other information activities initiated by the Library itself. Since last year the NLE has offered a direct ordering service via facsimile transmission. This high-priced service has been established for very urgent requests. At present the usage frequency is quite low. A turning-point may be the planned online access to ECONIS. Having finished the online searching, an order module will permit the user to initiate an ILL request for a monographic publication or an order for the photocopy of an article. There is still a great deal of work to be done with the system. But in the not so distant future it will be a great help for the user in automatically routing his request within the same system in which he had done his search.
These developments will influence the share of the NLE as concerns the online document ordering via the Serials Database. At the moment the extent of such a structural change in demand cannot be predicted.

Notes

1 More comprehensive information may be found in: Seusing, Ekkehart, The information activities of the National Library of Economics in the Federal Republic of Germany. "INSPEL", Berlin, Vol. 20 (1986) no. 3, pp. 148 - 160.

2 Source: Statistische Übersichten für das Jahr 1989. Bibliothek des Instituts für Weltwirtschaft an der Universität Kiel. Zentralbibliothek der Wirtschaftswissenschaften in der Bundesrepublik Deutschland. Kiel 1990.

3 Braun, Traute, Online-Komponente bei der Volltextbeschaffung in der Bundesrepublik Deutschland. In: 21. Arbeits- und Fortbildungstagung der Arbeitsgemeinschaft der Spezialbibliotheken, Kiel, 25.-28. März 1987. Leverkusen 1987. Pp. 128-138.

4 The British Library Lending Division's overseas photocopy survey, 1984. "Interlending and Document supply", Boston Spa, Wetherby, Vol. 13 (1985) no. 2, pp. 47-48.

5 Törnudd, Elin, Document supply by science and technology libraries - is there a role for international organizations? Paper given at the 55th IFLA Council and General Conference, Paris, 19-26 August 1989 (mimeo).

6 Line, Maurice B., National planning and the impact of electronic technology on document provision and supply. "Libri", Copenhagen, Vol. 35 (1985) no. 3, pp. 181-190.

7 Oppenheim, Charles, Why is online bibliographic information so unimportant? "International Journal of Information Management", Guildford, Vol. 7 (1987) no. 4, pp. 197-204.

Table 1 - Requests by types of users

Users	Year of request			
	1988		1989	
	Frequency	percent	Frequency	percent
Industrial libraries	199	58,4	244	51,2
Research institutes	71	20,9	140	29,4
Management consultants	47	14,0	59	12,4
University libraries	9	2,6	18	3,8
Administrative libraries	14	4,1	15	3,2
Total	340	100,0	476	100,0

Table 2 - Requests by subjects

Subjects	Date of request			
	1988		1989	
	Frequency	percent	Frequency	percent
Economics	74	21,8	159	33,4
Business administration	110	32,3	159	33,4
Selected goods	92	27,0	72	15,1
Newspapers	21	6,2	8	1,7
Social sciences	5	1,5	11	2,3
Others	38	11,2	67	14,1
Total	340	100,0	476	100,0

Table 3 - Requests by date of publication

Date of publication	Year of request			
	1988		1989	
	Frequency	percent	Frequency	percent
1989	-	-	77	16,2
1985 - 1988*	230	67,5	223	46,9
1980 - 1984	52	15,3	76	16,0
1970 - 1979	37	10,9	55	11,6
1960 - 1969	7	2,1	15	3,1
1945 - 1959	7	2,1	21	4,4
before 1945	7	2,1	9	1,8
Total	340	100,0	476	100,0

* Date of publication 1988 only: 49 requests in 1988 resp. 97 requests in 1989

Table 4 - Requests by country of publication

Country of publication	Year of request			
	1988		1989	
	Frequency	percent	Frequency	percent
Federal Rep. of Germany	136	40,0	150	31,5
Switzerland	46	13,5	35	7,4
United Kingdom	19	5,6	30	6,3
Netherlands	22	6,5	24	5,0
Spain	-	-	17	3,5
Other countries in Europe	18	5,3	39	8,2
USA	80	23,5	146	30,7
Others	19	5,6	35	7,4
Total	340	100,0	476	100,0

WORKSHOP SOCIAL SC. LIB.
Theme: New Developments in Document Delivery: the Social Sciences
145-SOC(WS)-5-(

DOCUMENT DELIVERY IN THE PACIFIC

BY ESTHER W. WILLIAMS

University Librarian, The University of the South Pacific

For internal use only:
Meeting No: 195
MI: yes/no

DOCUMENT DELIVERY IN THE PACIFIC

BY ESTHER W. WILLIAMS

University Librarian, The University of the South Pacific

(Presentation accompanied by slides)

The Pacific is a vast region covering an area of 30 million square kilometres of which less than 2% is land, the rest is ocean. Most of the 22 island states that make up the Pacific region are small, scattered, resource - poor newly independent states. The distances between the countries and between islands within countries are great. Transportation difficulties are numerous complicated by poor shipping and air services for some areas in the region, poor travel schedules, and expensive travel costs. Because of the infrequent transportation services a number of the island states are cut off from the rest of the world for long periods of time. However, in recent years developments in communication systems and facilities, as well as postal services have enabled the Pacific to take an active part in various international communication networks focusing on trade, economics, foreign affairs and information services.

The total population of the region in 1989 was 5.8 million. A number of the countries have some of the highest population growth rates in the world with the Solomon Islands growing at 3.5%, Federated States of Micronesia at 3.5 %, Vanuatu at 3.2%, American Samoa at 3.7%. There is considerable linguistic variety in the region. Tonga, Niue, Western Samoa have strong homogeneous languages. Vanuatu, Solomon Islands and Papua New Guinea have a

BANGKOK XEROX

great number of different languages including pidgin and in Vanuatu, French is also the language of communication and work. Apart from the variety of languages spoken, English is the official language for many of the countries.

Economically most of the island states are in the low per capita income group ranging from Niue with US$259.00 to Fiji with US$1874.00 (1989). Education is a regional priority but costly. Research carried out by scholars within and outside the region is also expensive but necessary.

As for the status of libraries in the region at the present time there is considerable variation in the stage of development libraries in the Pacific have reached. They extend from those relatively very poor libraries struggling to improve budgets, stock, and services and the larger libraries which receive some government support but are still functioning with limited finance and trained personnel. Over the years there has been improvement in the areas of collection building, communications, training, and cooperative programmes. This has been largely the result of librarians working hard and of assistance, both in money and expertise received from abroad. The developments in computerisation and satellite technology have also contributed to the development of libraries and document delivery in the region. Despite these developments and the continuing changes in the social, cultural, educational, and economic conditions of the countries, governments continue to ignore the need to develop libraries of all types in the region. While education

XEROX

opportunities have grown, access to information and knowledge remains poor.

Against this background the system of document delivery in the Pacific will be discussed focusing on: the bibliographical tools that exist, the system of transfer of documents, the experiences and difficulties encountered. Particular attention will be devoted to document delivery covering the countries served by the University of the South Pacific (USP). These include the eleven island states that are part of the University: Cook Islands, Fiji, Kiribati, Nauru, Niue, Solomon Islands, Tokelau, Tonga, Tuvalu, Western Samoa, Vanuatu.

It has long been accepted that being far away from the main centres of research and major library collections access to documents and specialised databases needed for personal and any research, study and consultancy become an important consideration. Document delivery as operated by the University Library on the local, regional and international levels highlight that:

a) the need is for all types of documents covering literature in the sciences and technology as well as the social sciences and humanities

b) while the Library is able to meet a large part of the needs for documents covering current research on the region from its collections (main Library in Laucala, Fiji, branch library in Alafua, Western Samoa, and national libraries within the region) it is necessary to request documents from other sources such as

RANK XEROX

the British Library, New Zealand and Australian University and special libraries

c) even though there is no formal interlending and document delivery system between the countries of the region, the informal system that exists within the University provides satisfactory services for users. This system has been in existence since 1972 and has been improved and extended as resources and technology permit

d) efficient and fast document delivery cannot exist without modern communication systems including fax, satellite communications and CD-ROMs

e) access to document delivery services are essential for scattered island states but services are expensive

f) essential to any document delivery service is the availability and accessibility of location tools

g) the supply of information documents for small island states cannot continue to be free: libraries and users making requests must be prepared to meet part of the costs of services.

When a user makes a request he either knows that the document is held by the USP Library by referring to bibliographical tools produced by the Library or has no idea of its location. The user making the request can be from any of the island states of the USP region, from abroad, or from other island states in the South Pacific. To assist the many users scattered over a vast area the Library, in 1982, established a Pacific Information Centre (PIC) with funds from the International Development Research Centre (IDRC), Canada. The objective of PIC is to identify, collect, and

record published and unpublished material originating in the region as well as material about the region published outside. The Pacific Information Centre has managed to produce a number of bibliographies including an annual South Pacific Bibliography, Union List of Periodicals, South Pacific Periodical Index, South Pacific Research Register. Interlending and document delivery rely on these tools as well as professional communication with users. These lists and bibliographies are distributed to over 3,000 libraries and institutions within and outside the region.

Maintaining these bibliographies is time consuming and an expensive activity. In 1989 the Library embarked on computerising its collection. The special Pacific collection is now on the database and in May 1990 the Library launched the reconversion of its entire collection of 300,000 records. Facilities to access the Library's database on line are available. It is planned to get the one branch Library and the nine centre libraries of the university Library system connected by January 1991. This will no doubt affect document delivery as users will be able to have access to the records instantly from a distance through a terminal on location.

In the area of fisheries the Pacific Islands Marine Resources Information System (PIMRIS), established in 1989 in the Library, provides a current awareness monthly service listing contents pages of periodicals held by the Library on living and non-living marine resources; monthly recent publications; and quarterly specialised bibliographies on a topical subject, for example

FRANK XEROX

climatic change, driftnetting, turtle fishing, etc. These lists are sent out to 270 users. These documents provide users with a useful location tool.

Through PIMRIS users are also provided with instant service if they require a search using ASFA on CD-ROM. The Library subscribes to this service and it has certainly helped PIMRIS users to obtain comprehensive database search on special topics. This is complemented by the USP Library database. The PIMRIS database lists holdings of USP Library and Fisheries departments in the region. This database is being developed using CDS-ISIS and by 1991 the combined records will be able to be transported on diskette to other fisheries libraries within the region that already have CDS-ISIS installed and running. This will be an important location and information tool.

For agriculture the location tools are also produced by the library of the School of Agriculture in Alafua, Western Samoa. The library receives CABI Abstracts on CD-ROM and together with its computerised database provides users with a fairly comprehensive source of document listing . Access to materials is through the standard interlibrary loan practices.

Interlending and document delivery is generally handled by the Reader services section of the Library. Requests have been mainly for articles in the Library's periodicals collection, items in the special Pacific collection or copies of research and

RANK XEROX

consultancy reports. Requests are received by letter, fax, or telephone. The IFLA and the Fiji Library Association interloan forms are also used for making a request. There are no special restrictions on how a request is to be made. Items requested for are identified from the collection of the University library, copied and sent off. If the item is not held a search for a holding library within the region including the South Pacific Commission Library, Australia, New Zealand, United Kingdom is made.The similar system is followed for requests for books. Being the biggest Library in the region it has been able to meet about 75% of the requests received. Demand for papers and documents and publications from within the region forms the bulk of the requests.

The mechanism of supply of documents on request is the same for the requests for general, marine resources and agriculture materials. The Library uses the postal service including courier, facsimile services, institution satellite services and telephone. The University has been fortunate in that since 1972 it has been operating using satellite communications as part of its fast growing distance education programme. The Library has been able to tap this service and get through to other libraries in the region regarding requests made. It is also through this service that teleconferencing can take place regarding a request. Fax service is very reliable and forms the basic communication equipment for all the USP centres and major libraries in the region. The Library is able to send documents from one country to another in a matter of minutes.

RANK XEROX

For PIMRIS and the general Library requests the document is usually sent by fax and the original sent by air. The Library has been keeping a record of the time it takes for the document to reach a destination and we have found that funny things happen. For the areas very far from Fiji - Micronesian countries for instance, it takes about seven days for a document to reach its destination. For requests closer to home it takes three weeks on most occasions. One explanation for this is that the flight schedules to the Micronesian states through Honolulu are good and this may account for the good turn around time. Requests from Fiji to New Zealand and back takes about 10 days; to Australia about 10 days also; to the United Kingdom 11 days; and the United States about 8 to 10 days.

Requests made to the USP Library for a book is normally sent by airmail to the user. Return is also by air. Turn around time is normally 14 days. The same rules apply to the requests we make to New Zealand and Australia. Turn around time varies and sometimes can take a month or more.

Any discussion on document delivery will have to address the question of costs. For the University Library the standard interlibrary loan service is provided free for official requests made by regional users, government departments, and regional organizations. For requests made by other users including University departments, staff and students photocopying charge

RANK XEROX

is 10 cents per page. All other interlibrary loan requests under ten pages there is no charge. Over 10 pages the charge is 10 cents per page. The costs are met from the Library budget. Costs of computer searches conducted for users using overseas databases are paid by the users. Cost of postage and communication costs for official requests are met from the Library's budget. For all other requests costs are paid by the user. Currently some of the requests made by developed countries is free.

But overall it goes without saying that any document delivery system costs money. Nothing should be free. The production of the location tools, telephoning requests, faxing documents are all expensive activities. Many libraries in developed countries put a very high charge to these products and it is only sensible and correct that the University considers reviewing its information products and document delivery service with a view of recovering costs. A system must sustain itself.

While I have tried to explain the operations of document delivery within the University system the problems and difficulties that exist must not be overlooked. In **Interlending in the Caribbean** (1989) Cornish groups the barriers to interlending (and document delivery) into three categories: those which are beyond the control of the library and the community, those over which that community has some control and those which are well within that community's control. In the first group he lists politics, language, legal issues, national issues and currency. These barriers are all applicable to the South Pacific region. For

RANK XEROX

instance, there are the problems with customs, postal regulations, and the transfer of moneys to pay for services and these can hinder the flow of information within and outside the region. Regional cooperation and the sharing of resources between libraries in the Pacific have overcome some of the difficulties but it is however correct to say that at this stage of development bulk of the document delivery service is met by the University Library.

Under the category of difficulties that can be partially controlled Cornish includes the Librarian's ability to affect change in the use of new communication technology, equipment and finance and all these affect document delivery. The University Library has been able to take advantage of the new communication systems that have emerged - faxes, CD-ROMs, computer services, and instant hook up to databases abroad - to improve its services overall.

The third category of difficulties are those created by the librarian. Here Cornish lists the reluctance of some librarians to take part in any resource sharing activity as they do not wish to lend resources to outside users. There is also the fear of becoming a big lender which obviously can become a financial burden. And generally there is the view that the home user will be disadvantaged. These, I feel, are concerns which can be overcome. The University Library over the years has spent considerable funds and time to get the system that is now operating functional to a point that the cooperating libraries

RANK XEROX

are able to meet their respective responsibilities. The development has been slow but in recent years the confidence, management skill and the overall training of those who are now part of the USP network in document delivery has improved. There is still work to be done but certainly the service is much better now than what it was eight years ago. The Librarians know that they must help each other in order to survive and provide satisfactory user services.

Document delivery in the Pacific is operating as best as the system allows it. Requests received are sufficient to keep the system manageable. This system has provided great benefits for the regional and local community (as well as international) in terms of an information service for a region where access to documents and books once proved almost impossible is now a normal service. The increased research activity and interest on the Pacific region will necessitate the development of a more effective document delivery system. This will require building upon that which already exists, extending reciprocal services to developing countries in the Asian and African countries, and attracting additional finance and trained people to operate the service.

FUNK XEROX

Bibliography

Cornish, Graham Interlending in the Caribbean. **International library review. (1989) 21, 249 - 261.**

The University of the South Pacific. **Annual report of the Library.1981 to 1989.**

The University of the South Pacific. Pacific Information Centre. **Reports for 1988 to 1989.**

Williams, Esther **Linking information resources sharing management and library training in the South Pacific.** Paper presented at an International Symposium on New Horizons in Agriculture Information, management and the related materials, Scientech Documentation and Information Centre, Beijing, China, March 13 - 16, 1990.

RANK XEROX

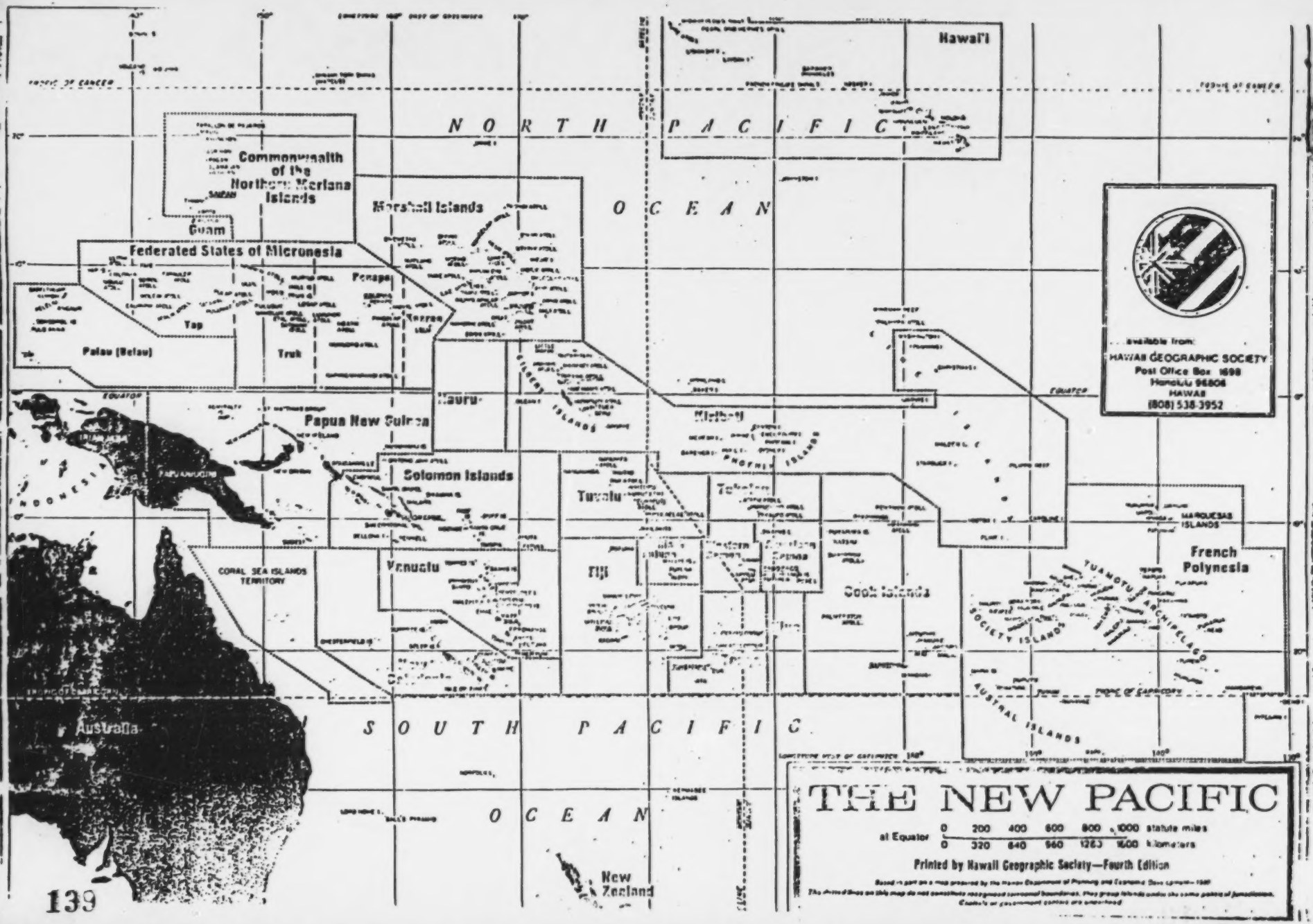
USP COUNTRIES : Key Indicators

Country	Membership WHO	FAO	ACP/EEC	Status	Land Area (Sq.Km.)	Latest Census	Total Pop. Last Census	Adult literacy % rate 1980	GDP Per Capita (SUS) (1983)
COOK ISLANDS	/	/	-	Self governing 10 September 1965	240	1981	17754	91.8	1360
FIJI	/	/	/	Independent 10 October 1970	18272	1986	715375	75.0	1820
KIRIBATI	-	-	/	Republic 12 July 1979	690	1985	66073	95.0	770
NAURU	/	/	/	Republic 31st January 1968	21	1983	8042	n/a	9091
NIUE	/	-	-	Self-governing 19 October 1974	259	1984	2532	100	1080
SOLOMON IS.	/	/	/	Independent 7 July 1978	23530	1986	285796	51.0	610
TOKELAU	-	-	-	New Zealand dependency	10	1986	1690	97.2	560
TONGA	/	/	/	Independent Kingdom June 1970	699	1986	94535	99.6	740
TUVALU	-	-	/	Independent 1st October 1978	26	1983	8364	98.0	570
VANUATU	-	/	/	Republic 30 July 1980	11850	1986	140154	n/a	700
WESTERN SAMOA	/	/	/	Independent 1 January 1962	2935	1981	162200	97.8	770

SOURCE AND NOTES:

United Nations. Population and Vital Statistics Report, 1st July 1988.
Pacific Islands Year Book, Sydney; Pacific Publications, 1989, 16th ed.
Unesco Statistical Year Book, 1988.
All countries are members of SPC.
Latest census for Fiji was taken in August 1986.
Kiribati - formerly Gilbert Islands.
Tuvalu - formerly Ellice Islands
Vanuatu - formerly New Hebrides

XEROX


Hawai'i
NORTH PACIFIC OCEAN
Commonwealth of the Northern Mariana Islands
Guam
Federated States of Micronesia
Marshall Islands
Ponape
Kosrae
Yap
Palau (Belau)
Truk
Nauru
Papua New Guinea
Solomon Islands
Tuvalu
Kiribati
Vanuatu
Fiji
Cook Islands
French Polynesia
MARQUESAS ISLANDS
TUAMOTU ARCHIPELAGO
SOCIETY ISLANDS
AUSTRAL ISLANDS
CORAL SEA ISLANDS TERRITORY
Australia
SOUTH PACIFIC OCEAN
New Zealand
available from:
HAWAII GEOGRAPHIC SOCIETY
Post Office Box 1698
Honolulu 96806
HAWAII
(808) 538-3952
THE NEW PACIFIC
at Equator 0 200 400 600 800 1000 statute miles
0 320 640 960 1283 1600 kilometers
Printed by Hawaii Geographic Society—Fourth Edition

166-SOC-6-E

IFLA
Stockholm, 23 August 1990

Workshop 195 : New developments in document delivery : the Social sciences.

An agreement between the libraries of European Business Schools for the exchange of documents.

Louis d'Arras d'Haudrecy
Head of Library
INSEAD
(Fontainebleau - France)

Mtg 195

It is now more than 20 years since a number of librarians from European Business Schols decided to create an association ; EBSLG was born.

The main aims were the following :

- a forum for exchange and information,
- to develop common activities.

Quite quickly, general meetings took place once a year ; other intervening meetings regrouped the librarians on a regional level.

One group, english mother tongue, a second scandinavian and a third, continental.

Now the number of members borders on 30.

*
* *

The group's main achievement was SCIMP (Selective Co-operative Indexing of Management Periodicals).

The database which acted mainly as an index of European articles, took off in 1976; At the Present time the references amount to over 80.000.

*
* *

More recently, in 1980, INSEAD propoposed to some of the members that they should develop a joint catalogue of periodical titles, whose sole purpose would be to circulate copies of articles.

It was a question of improving a service which was becoming heavier and more and more expensive, and which would avoid having to pass the great majority of the requests to the largest supplier : the British Lending Library.

*
* *

The first catalogue came into existance in 1988.

It brought together 8, mainly french-speaking, institutions :

- ESSEC and HEC (région parisienne)
- IAE in Aix-En-Provence
- INSEAD in Fontainebleau
- ESPO in Louvain-La-Neuve (Belgium)
- IMI and IMEDE (Switzerland) (now known as IMD)
- SAMA (Turin)

In total just over 2000 titles and about 1500 photocopies were exchanged.

*
* *

With the second edition of the catalogue, in 1989, ISTUD (Belgirate - Italy) and ESADE (Barcelona) joined in.

The catalogue amounted to about 3000 titles. The number of exchanged photocopies had significantly increased to more than 4000.

The 3rd edition (1990) is very different from the previous ones, as 4 important institutions have joined in :

- Nijenrode (Netherlands)
- Arhus (Denmark)
- Manchester (United Kingdom)
- St Gallen (Switzerland)

Of course we cannot as yet tell how many photocopies will be made in 1990. The number of periodical titles has risen to about 6000, that is to say triple the first edition.

As well as this, the collection is becoming more and more international since the libraries are no longer just french speaking, but are located in France, Belgium, Spain, Italy, Switzerland, The Netherlands, The United Kingdom and Denmark.

A fourth edition is planned for 1991. It should also include :

- Paris-Dauphine
- Copenhagen
- Rome
- Templeton (Oxford)
- Warwick (Coventry)

*
* *

The basis has stayed the same, which has been the main reason for the success of the operation. The rapid sending of copies is considered a reciprocal service.

Whilst awaiting the European ECU the rates can vary very slightly from country to country. The french libraries have a price of 2,50 FF per photocopied page. A bill is sent twice a year, however, it is often jsut a matter of a straigh-forward swap and no billing takes place.

The future should also bring about changes other than quantitative ones. Three libraries are experimenting with requests sent by MAIL : ESSEC, IAE-AIX and INSEAD. This system of messages should spread.

*
* *

The advantages for an institution like INSEAD are apparent and the development will carry on :

	1987	1988	1989
BLL	90%	50%	43%
EBSLG	5%	20%	37%
Other	5%	30%	20%

Despite an increase of 17% in the number of articles received, the expenditure has decrerased by 35%

Equally, the lead-time also has significantly decreased to within a week.

*
* *

To conclude, a network established on pragmatic grounds and based around an existing association is a success.

One weakness, perhaps, due to the thematic nature of EBSLG, is the lack of periodicals outside business and management, in areas such as the sciences and psychology.

167-SOC-7-E

ABI/INFORM FULL TEXT

by

SUSAN ORCHARD

SALES MANAGER
UMI/IPI
Godstone, England

Mtg 195

by Susan Orchard, Sales Manager, UMI/IPI, England

The theme of our session this morning is "New Developments in Document Delivery: the Social Sciences Angle". In order to understand the background to these developments, we need to have a look at the history of document delivery. I will start by giving a brief history of how UMI's document delivery methods have evolved and I will then go on to talk about how UMI is involved in the latest technological advances in document delivery. At the end, I will be pleased to try and answer any questions you may have.

When Eugene Power started UMI in 1938, he had a simple goal: to improve the accessibility of information. 52 years later this goal still holds true at UMI as information delivery systems continue to evolve.

When UMI was founded, there was an increasing thirst for knowledge amongst americans and Eugene realised that much of the material which they required was only available in the old libraries of Europe. He investigated various methods of providing this information, including offset, multigraph and photostating. However, he was most impressed with the potential of microphotography and to that end he had a microfilm camera built in Ann Arbor, Michigan, and took it to the British Museum where he began the long process of photographing all available books printed in english before 1550.

Following the growing public interest in his work, in June 1938 Eugene Power formed his own company which he called University Microfilms. This company consisted of 2 backrooms in a funeral parlour. Before this, a lot of valuable information had not been made generally available as it was uneconomic to produce small print runs of books and journals. Eugene Power pioneered the concept of on-demand publishing. With microphotography it became cost effective to reproduce on demand just one copy of a particular item. In 1939 Eugene Power started to microfilm dissertations in order to provide graduate students with an economical alternative to offset printing as a means of meeting their doctoral publication requirements. During Worldwar II he eventually photographed 13 million pages of manuscripts in Europe which were in danger of destruction from bombing.

Over half a century, UMI has added other programmes to the vast collection of information sources. UMI can now provide over 1 million doctoral dissertations, reprints of over 100,000 rare and out-of-print titles, approx. 25,000 newspapers and periodicals in microform, most of which have been filmed right back to the very first issue, and various research collections. For example, as I mentioned, UMI started by filming all english books from 1475 to 1550. This programme was expanded to cover all titles in the english language published up to 1700. We are still filming these titles today so you can see just what a vast undertaking that was.

Over the years UMI has expanded its information base and the media we use to provide access to this information has evolved with technology. As well as providing items in microform, UMI provides reprints on paper and can also provide various online databases. We still believe that microform has a vital role to play in the provision of scholarly information but we at UMI have also been forerunners in the introduction of new technology. Electronic publishing offers some wonderful advantages in the access to and distribution of information. Although online systems continue to play an important role, inroads in the area of CD-ROM technology are generating the most excitement.

When we were considering how to move forward with the new technologies, we looked at all the available options, bearing in mind the type of information which we wanted to offer. We first looked at 12" video discs but these were rejected as both the media itself and the hardware were too expensive.

The next possibility was CD-ROM and our investigations showed that this media could be made available at a cost that wasn't prohibitive for our customers. Also, the hardware was readily available and reasonably priced.

We then had to decide what kind of database to start out with in CD-ROM publishing.

Over 1 million dissertations have been written at North American Universities since 1861. Through UMI's programme, started in 1939, this original research has been made available to scholars worldwide in microform or as paper copies. The all important access to this information has been provided by our printed *indexes, dissertation* abstracts international and the annual comprehensive dissertation index. As the CDI and DAI databases are UMI's own publications, this seemed to be a logical way to get involved in the new CD-ROM technology. So in 1986 we brought out our first CD-ROM product which was called Dissertation Abstracts Ondisc.

Also in 1986 UMI acquired a company called Data Courier, a company which produces business information. People's need for accurate and timely business information is growing all the time. For this reason, we decided that our next CD-ROM database should contain business information. One of Data Courier's databases is called ABI/Inform. ABI stands for Abstracted Business Information and that is exactly what it contains. The database contains comprehensive abstracts of articles from 800 leading business and management periodicals. ABI/Inform on CD-ROM came out 2 years ago and consists of 2 CD-ROMs which contain the complete database back to 1971 plus a current disc which contains the last 5 years worth of information and is updated monthly. As soon as a particular journal issue has been published, the articles are indexed, abstracts are written and the information is included on the ABI database, so that you always have the very latest information at your fingertips.

Of course as I am sure we are all aware, the more information that people can access, the more information they want. So how do we go about providing them with this information? As I said, ABI contains abstracts of articles from 800 leading business and management periodicals. As well as the abstracts, there is of course full bibliographic information about each article, including the name of the journal where the article appeared, the year, the issue number and the actual page on which the article appeared. Once ABI/Inform on CD-ROM is installed in a library,the users have access to current business information in an easy to use format. However, ABI only provides abstracts, albeit fairly comprehensive ones. How do we then go about providing the users with the complete articles that they require in the most cost effective manner?

Picture this scenario: we want to find out some information about, for example, junk bonds. We go into the library and there, at its PC workstation, is ABI/Inform Ondisc. We carry out a search on ABI/Inform and find 55 references to junk bonds. Now, some of these might not be relevant to our needs. So we can either combine junk bonds with another term and narrow our search down a little, or we can go and have a look at the abstracts and see if they provide the exact information we are looking for. We could then make a selection of, say, 10 titles that are of interest and print out the bibliographic citations and the abstracts.

We then go to our library information desk and ask the librarian or information specialist where we can get hold of the complete text of these articles. On looking through the list, we are told that the library only subscribes to three of those journals. For the other seven we will have to use the interlibrary loan procedure and we are not sure exactly how long that will take. We are told exactly where to find the first 3 items in the library. We go along to the shelf and we find the first journal and the article that we want. We then go to the microforms area and locate the article we want on a UMI microfilm. Then we look for the third journal and we find that the article we want has been torn out. So out of the ten items that we are specifically interested in, we have found precisely 2 available immediately. That is a hit rate of just 20%!

Imagine this next scenario. We walk into the same library a bit later and again, we are interested in finding out information about junk bonds. There in front of us we see not just a simple PC and CD-ROM drive but a complete workstation containing a 386 PC, a large screen monitor, a dual CD-ROM drive and a laser printer. Also attached is a modem. On this workstation we again have ABI, so that we can carry out our search and find the same number of records and therefore the same ten articles in which we are interested. The difference here though is that instead of just ABI on the workstation, we also have business periodicals ondisc. Business Periodicals Ondisc or BPO as we call it, contains the full text of over 330 of the journals abstracted and indexed in ABI. These images have been electronically scanned and put onto CD-ROM so that the image you see on the CD-ROM is exactly the same as the image you see in the original journal. The titles currently on BPO were selected as they are the most frequently requested titles from the online version.

Let's return to our search. We carry out our search on junk bonds, find ten items, go to have a look at the items to check that the abstracts are relevant and there is a line at the bottom of the screen which says: "For complete article, press enter." The enter key is pressed and a message appears on the screen, telling us that the complete article is contained on a particular disc. We then put the required disc into the disc drive, press the enter key and the complete article appears on the screen in front of us. At the press of another button, the complete article is then printed out onto the laser printer. We now have access to many more of the items required right at our fingertips. In case, however, some of the full-text items are still not available through BPO, we can use the modem to order the article requested through, for example, UMI's Article Clearinghouse or through the British Library document supply Centre. All the information we need is contained therefore in one very easy to use workstation. We have come a long way from the time when journals published in one part of the world were shipped by surface mail to another part of the world and could take 6 months or more to reach their destination.

Let's talk a little bit about the actual database contents now. The material at the moment is all english language material. However, UMI is looking to expand its coverage to include english language titles from parts of the world outside the USA and the UK and also to include major european titles if possible.

Regarding hardware requirements, a simple PC is obviously not sufficient to display the scanned images the way they should be displayed. In the USA, UMI supplies the ABI and BPO compact discs already set up on a workstation which we call the IDS 2000 workstation. It is, unfortunately, not possible to provide this workstation outside the USA. Despite the fact that 386 PC's are widely available throughout the world, the US customs will not allow them to be exported. We are therefore contacting local suppliers for this equipment in the countries which we deal with and we have found hardware suppliers who are willing to supply and configure the necessary workstations in several countries already.

UMI has now launched its next full-text CD-ROM product called General Periodicals Ondisc or GPO. The abstracting and indexing database is called Periodical Abstracts Ondisc and contains article abstracts from 450 general interest periodicals. GPO contains the full-text images of 150 of these titles. We are in the process of testing other potential full-text databases as well, including an engineering database.

It has been decades since a storage technology has held as much promise as CD-ROM does. Currently, the challenge in electronic publishing is to develop products and systems that make maximum use of CD-ROM technology. When CD-ROM hit the scene about five years ago, expectations ran high. We think that the enthusiasm is completely justified, but we all need to be realistic about what we can and can't expect from CD-ROM.

Initially, users wanted more than one user to be able to access the CD-ROM discs. At the time, the technology was not advanced enough to offer this capability. Today, the technology issues have been resolved and there are a number of local area ASCII network software packages that support shared access to CD-ROM products. Also, the large number of available titles has made collection building for CD-ROM applications easier.

The progress is evident, but challenges still exist. UMI is actively researching solutions that will enable all users to gain maximum benefit from CD-ROM technology. For instance, we are researching networking solutions for a line of full-text image and ASCII CD-ROM databases and we're also pursuing a jukebox application that enables users to access full-text information faster and easier.

A critical mass of users is forming in electronic publishing. And as this mass of users continues to put its investment behind its confidence in the technology, we are all assured of forward movement in the development of new applications.

So, where do we go from here in electronic publishing? Simply, we continue to pursue Eugene Power's original goal: improve the accessibility of information. Some of the forecasts for the future include:

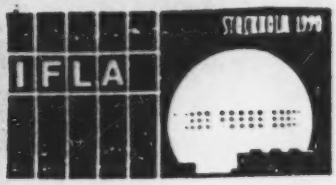
* More integrated library systems, which will interface directly with local database products.

* Networking of library resources within cities, university campuses and school systems to provide better access to information. UMI is actively involved in making its databases networkable on mainframe systems.

* More helpful, simpler-to-use interfaces for all library services. Information retrieval will be accomplished at all levels with more accuracy by a much larger user group.

Ladies and gentlemen, in producing its full-text scanned image databases like Business Periodicals Ondisc on CD-ROM, UMI is utilising the very latest technology to try and enhance both the quality and the quantity of information which can be provided by information centres. This will enable you to provide value-added services for your users in a timely and cost-effective way. CD-ROM technology is here to stay to the benefit of us all.

IFLA GENERAL CONFERENCE STOCKHOLM 1990



Division:
SPECIAL LIBRARIES

Section/RT:
GEOGRAPHY AND MAP LIBRARIES

102-GEO-1-E

Digital Mapping on CD-ROM

by

Peter G. Ochman

Map Curator

Baillieu Library

The University of Melbourne

Parkville, Victoria, Australia 3052

For internal use only:

Meeting No: 131

SI: yes/no

DIGITAL MAPPING ON CD-ROM

Peter G. Ochman

Melbourne, Australia

ABSTRACT

Developments in CD-ROM and PC technology have enabled publication of a number of mapping packages on CD-ROM incorporating extensive spatially related data sets.

The author reviews existing packages in relation to their contents, design features and viability of installation in map libraries at a time when many paper copy maps are no longer being revised. Reference is made to the significance of design in producing CD-ROM based mapping packages.

JUNE, 1990

DIGITAL MAPPING ON CD-ROM

Peter G. Ochman

Melbourne, Australia

INTRODUCTION

Recent developments in microcomputer technology and development in optical storage devices opened new way for storage, distribution, analysis and evaluation of geographic information including maps, remotely sensed imagery and large spatially related data sets.

There are following optical storage devices:

1. Videodisc,
2. Compact Disc-Read Only Memory (CD-ROM),
3. Write-Once-Read-Many (times) (WORM),
4. Re-writable (Magneto-Optical).

In this paper I will concentrate on reviewing applications of CD-ROM technology in handling geographical and mapping data sets. A brief mention of a most popular videodisc is also important as the Domesday Book project pioneered the use of optical storage for maps. User interface and design consideration in microcomputer based mapping are also discussed with a view to improving the efficiency of the systems and making them available to as large a group of interested users as possible.

PRODUCT REVIEW

Current status of optical storage technology provides a number of options for mass data and/or image storage.

Videodisc - a microcomputer controlled interactive video disc system such as 'The Domesday Book Project' a BBC Enterprises production which offers storage capacity up to 54,000 still images per side of a 12 inch disc. A videodisc has a capacity to hold some 9,000 sets of data beside the images. Some 500 background maps were produced from the Ordnance Survey's 1:625,000 digital database with various map frame areas ranging from 320 x 220 km, 160 x 110 km or 80 x 55 km. The output of the maps depends upon the size of output device (Cartwright 1988). The Domesday package consists of two 12 inch laser disks. Both include the Ordnance Survey maps with scales between 1:625,000 and 1:100,000. Text and photographs can be combined with the maps. The package also features an extensive gazetteer. A price just under £4,000 for the videodisc together with a hardware setup makes it viable for many reference libraries. BBC Enterprises have announced recently that they plan to follow up their successful 'Domesday Book' project with other interactive videodiscs on a variety of themes including ecology. Similar projects with other countries are considered.

CD-ROM - Compact Disc Read Only Memory is an optical storage device which has been used widely from the mid 1980's for massive digital data storage and distribution. It has a capacity of up to 550 megabytes (Mb) which is roughly equivalent to 270,000 pages of text. Information is written on to the compact disc using laser technology and it can be retrieved using a CD-ROM drive (performing a similar function to a floppy disc drive) attached to a personal computer. A CD-ROM is identical in physical appearance and construction to an audio CD. Advancements in processing capacity in microcomputers and developments in computer graphics technology enabled a successful merger of CD-ROM data storage with maps.

Supermap. The first CD-ROM based mapping package was launched at the University of Melbourne, Australia in 1986 as a result of research under the direction of Dr J. Massey. The package, later named Supermap, was the first to combine Australian

census data and matching digital mapping into one system for use on a personal computer. A year later 'CData86', a 1981 and 1986 Australian Census on CD-ROM, was published. This contained data from both censuses on a single CD-ROM. Supermap's file structure enables fast searching of data directories and transformation of census data into a table, spreadsheet or map form. Tables could be saved and transformed into spreadsheet files which can then be used utilising commercially available spreadsheet packages. Raster generated choropleth statistical maps could be analysed on a personal computer with an EGA (Enhanced Graphics Adapter) screen or printed using monochrome or colour ink-jet printers. The cost of this package is relatively inexpensive, A$ 4,000 for the CD-ROM package only Hardware requirements to run the CD-ROM based mapping system such as Supermap are: IBM Personal Computer (PC) AT/XT or compatible with up to 7 Mb free on the hard disk, at least 512 kilobytes of Random Access Memory (RAM), CD-ROM drive in High Sierra format, with Microsoft CD-ROM extensions, a colour ink-jet printer - for maps, an alphanumeric printer - for tables. Space-Time Research, the company producing and marketing Supermap released other CD-ROM's which combined statistics and maps.

A range of discs was published in conjunction with the Australian Bureau of Statistics: Australian Municipal Information System (AMIS) 1987 and 1988 Release, Standardised Local Government Finance Statistics (SLGFS) 1986/87, Agricultural Data Dissemination Service (ADDS) 1985/86, 1986/87, Australian 1985/86 Retail Census. A number of Census products were released by Space-Time Research in cooperation with relevant statistical and census organisations. Those include: 'Supermap USA 1980 Census' which contains information down to census track level - the smallest geographical unit comparable in size to 1-4 street blocks, 'New Zealand 1986 Census', 'Hong Kong 1981 Census and 1986 By-Census', 'Swedish Census Data 1970 to 1987', produced in conjunction with the University of Uppsala and contains approximately 2 200 items of information for the 284 communes, 24 lans, and Sweden as a whole, together with map boundary data for the communes, lans and the country.

Supermap database retrieval software consists of a number of modules. The first module, Items, enables the user to compare expressions from the selected items, which are keys to access a statistical database; the second module, Regions, is for selection of geographic area units for the region of search. The next module, Retrieve Data, combines and item and region to retrieve a table of data, while Compare Data would retrieve and compare data for two censuses and is only available for CData 86. Design a Basemap module enables the construction of a basemap for a defined region by retrieving a boundary file from a CD-ROM, rescaling and preparing it for mapping data. While creating a basemap individual areas could be removed and re-selected. The areas too small to see clearly may be boxed. The software would do it initially with all small areas, but these can be later "unboxed" if desired. The module has options for adding lines, annotating, creating enlargements of a desired area, and selecting a specific geographic spot by searching a gazetteer. Defining a region by radius is also possible. A basemap can be edited using a Recreate basemap option. Mapping of data is done in the module called Map Retrieved Data. A sequence of maps displaying variables representing a choice of columns from a spreadsheet table can be produced in either monochrome and colour. The maps are usually choropleth statistical maps; Dot maps are optional for areas for which the digital boundaries are not readily available. A choropleth technique is a method of cartographic representation which employs distinctive colour or shading applied to statistical or administrative areas. Once a choropleth map appears on the screen a number of classes can be altered from 2 to 10; the number of classes is global and all maps are classified into the same number of classes. The classification could be changed and so can the class bounds. The are options to change colours, a choice of 64 EGA colours or monochrome shades of grey is available. Captions and description of classes can also be adjusted. For better interpretation of statistical contents of a map one may select to have a class blinking on screen. While comparing changes in the spatial distribution pattern of two variables a toggle option would allow flipping rapidly

between two maps which causes anything that is different between the two maps to blink. A still map, with adjusted colours, added title and captions, could be printed using ink-jet printers. Paper colour and monochrome maps as well as on transparent plastic material can be obtained.

In addition to the above described options Supermap software offers modules which enable the user to modify existing tables - by specifying constraints and identifying areas of interest and identifying areas of interest and ranking data by sorting tables of data in ascending or descending order. Data Interchange module allows data to be imported and exported to and from other software packages, such as Lotus and Excel. Cleanup option provides general housekeeping like deletion, copying and moving files. Options lets the user configure the system to suit particular preference and hardware configuration. The package is equipped with extensive on-line manuals which can be consulted separately and as a help option. These manuals are very useful especially for users with little experience with the system and for those not acquainted with the system's unique terminology.

Norwegian Domesday Book. Another example of a CD-ROM statistical package is a 50 Mb CD-ROM database produced by Archetype Systems, giving population statistics from 1976 - 86 and projections to 2011 for all 454 Norwegian municipalities. Maps, satellite data and encyclopaedia supplement covering local and current international affairs are included in the project, which is aimed at town and country planning and is seen as a prototype for a 'Norwegian Domesday Book'(Information Market, 1987).

MundoCart/CD was created by Petroconsultants CES as a mainframe mapping database for the petroleum industry. This CD-ROM database contains digital cartographic information for the world's land surface including coastline, drainage, international boundaries and city outlines captured at a scale of 1:1,000,000 (1:1M) from the Operation Navigation Charts (ONC) published by the Defence Mapping

Agency in the USA. Antarctic regions were digitised from the Soviet Karta Mira as the ONC maps for this area were not available. MundoCart digital mapping base is characterised by excellent line accuracy and feature classification codes which allows the user to distinguish not only individual segments but also these features required for a particular map (1989, MundoCart). The package offers base maps at 1:1M, 1:5M, 1:25M and 1:150M; the smaller scales being derived from the 1:1M data set.

MundoCart/CD can be of use by those with GIS and map production requirements. In libraries it is used for preparation of base maps, required by a reader for further annotation providing the person at the terminal with a basemap at the scale and projection most appropriate for the chosen area. Tracing of maps then becomes unnecessary. The system has wide applications in various industries, remote sensing and environmental research and in educational institutions. In order to retrieve a map some tasks need to be performed in the program using mouse-menu driven commands. Firstly, the area of a chosen map has to be defined in one of two ways: by using the mouse to box the area or by using Search option which has an extensive gazetteer classified by the type of geographical features which are listed in alphabetical order for each category. This enables the user to make a quick selection when a map of a particular geographical feature is being retrieved, such as an island or a country. The next step involves selecting the features to appear on a map by simply turning them on and off. Then in Display option the system would retrieve a map of the chosen area from CD-ROM according to specifications provided by a user including scale, one of 26 projections and 26 ellipsoids, display colours and graticule. The graticule interval may be selected by a user or MundoCart can compute an optimum graticule if desired. The displayed map, which may take up to several minutes to appear can be saved into a digital file and later plotted. It can also be annotated and further added to using on of the commercially available Computer Aided Drawing (CAD) packages. MundoCart/CD gives a micro Geographic Information System (GIS) capacity by allowing

incorporation of dBase files with the system maps. As MundoCart/CD is the first portable system offering a range of scales, projection and ellipsoids to a map designer it does not include a guide to projections which may cause an inexperienced user to create inadequate maps. It is recommended that the system to be used with some expert advice as to appropriateness of a projection and ellipsoid for different areas of the World and while creating a map with a specific purpose in mind in order to minimise distortions of equal area and conformity.

Hardware requirements for MundoCart/CD include IBM PC XT/AT or compatible with at least 640 Kb of RAM and at least one megabyte of free space on the hard disk, a mouse, CD-ROM drive and controller Card, EGA colour or monochrome monitor with 256 EGA Card and a math co-processor chip. A printer or plotter that supports HPGL software is also required.

Planetary Data System developed the IMDISP program, an interactive image display utility for the IBM PC, XT/AT and compatibles. It has been developed for use with the CD-ROM storage system. It can also be used to display images stored on floppy or hard disk. Other support systems have also been developed. These packages include the United States Geological Survey (USGS) Planetary Image Cartography System (PICS) for Microvax Computers, a set of Fortran routines to access CD-ROM disc on VAX computers. The initial development efforts by the PDS have resulted in the production of five CD-ROM's, two samples and three containing all 6538 images of the Voyager Uranus encounter. The IMDISP program can be used to display most of these data files on a personal computer screen. The raster image processing software enables a researcher to analyse and interpret the contents of an image and correct some radiometric and geometric distortions.

IMDISP requires an IBM PC XT or AT or compatible with 512 Kb of RAM. EGA 256 Kb memory is ideal for the system. It also supports other graphics configurations (PDS, 1988). This application of CD-ROM allows quick and inexpensive

distribution of large digitally stored images, which are of interest to many researchers around the World.

Electronic Map Cabinet. With the enthusiasts of microcomputers divided between PC and Macintosh followers it would be unfair not to mention a Mac driven CD-ROM mapping software. Highlighted Data Inc. has produced the 'Electronic Map Cabinet' which requires a Mac SE with five megabytes available hard disk space (WMB, 1990). There is a considerable advantage for the icon operated Macintosh system which appears to be more easily learned by most users.

APPLICATIONS AND USER INTERFACE

Only recently have PC based products begun to match the friendly environment image of Mac microcomputers. Further developments of 'Microsoft Windows' - applications allows easier access to large and complicated databases. Many popular PC software packages adopt this new user interface. Research is undertaken to improve human-computer interaction (HCI) in relation to geographic information systems (GIS). The packages described above are forms of GIS and the improvements sought by software designers can easily be recognised in a review of the development of packages such as MundoCart/CD or Supermap. Turk (1990) describes 'as geographic information systems (GIS) technology matures and develops towards sophisticated decision support, there is an increasing need to optimise human - computer interaction aspects. Although further advances in graphic interface design and operator training are required, the principal challenge is now in the ergonomics of shared cognitive responsibility operator and computer system' (Turk, 1990). Consideration of a cartographic user interface which includes a variety of components has been given more attention recently. It is an interface intended for the creation and manipulation of maps. It encompasses the rules and conventions that govern how a map user interacts with a computer to make and transform maps. This interface must make use of a graphic pointing device, be intuitive to use and

incorporate accepted cartographic principles. As the computer becomes a more common medium for cartography, the interface between map and computer will assume a greater significance (Peterson, 1989).

Another aspect is design consideration in Computer generated mapping, as in many cases only small areas are capturable on avideodisc frame with reasonable clarity, therefore map graphics must be designed so that the amount of earth area desired on the frame is represented in that small map (Olson, 1984). This is also a constraint of CD-ROM based maps, and the user community critical reaction to computer map design is appreciated by commercial CD-ROM map products publishers. Graphic design of maps and menus are significant but the importance of terminology used and sufficient on-line and hard copy manuals cannot be omitted. User education and training in the subject of the package and the way it can be effectively put to use is vitally important. Since the introduction in 1986 of a range of Supermap CD-ROM products in the University of Melbourne Library Map Collection and later MundoCart/CD a steady increase in practical use of those packages can be observed. In 1987 the Library had 59 CD-ROM queries, in 1988 - 352 and in 1989 - 560, which represents 59% increase annually. In 1989 CD-ROM queries formed 28% of the number of attended queries.

Initially availability of the packages in the library's map collection was widely advertised on campus. Regular seminars for prospective and existing users are now held. The Map Curator liaises with software developers and suppliers and provides regular user training which then helps to encourage most effective use of the existing facility. The environment of a major teaching and research institution makes it possible to coordinate various departmental and faculty activities with library activities. With a broad range of users accessing CD-ROM mapping packages it can be observed that overall computer literacy increases every year, as most users attempting to use CD-ROM's have some prior computing experience. This helps to explain the sometimes complicated structure of data retrieval packages. The common problems include inadequate understanding of

systems contents and retrieving capacity, inadequate knowledge of the system, lack of training and inadequate hard copy user manuals. This can only be overcome by systematic training that the University of Melbourne Library is attempting to offer to the academic staff and students. It is warranted to devote Map Library staff time in training users as this reduces any on-going assistance and thus saves a significant amount of time. There are libraries that offer CD-ROM mapping packages in their reference sections and in some cases reference librarians assist with all inquiries. As this incurs a cost in staff time and consumables spent on printing maps and tables some public libraries offer this service on a user-pays basis.

CONCLUSION

Developments in computer graphic technology, further decrease in price of CD-ROM workstations allows their greater availability.

Increased understanding of concepts such as Data Base Management Systems (DBMS) and Geographic Information Systems (GIS) opens the way for more CD-ROM mapping products to be published.

Map libraries gradually become the Spatial Data Information Centres (North, 1988; Ochman, 1988). Many government map agencies cease to publish further updates of topographical maps in paper format. The maps are only being maintained and updated regularly in digital format. The means has to be found to distribute this mapping information, no longer available in a hard copy, to members of the public.

One has to realise that computerised map in GIS is only used as a query window, where data of various levels of sophistication can be displayed according to user's needs.

Map producers should be encouraged by the library world to publish more maps and GIS packages in CD-ROM format. There are a number of advantages such as durability of material, compact size (saves a sizeable storage space), rapid and flexible access and an inexpensive means of updating.

Networking of computer workstations with devices like CD-ROM drives with appropriate servers, enables the interrogating of CD-ROM data bases from remote locations.

Will I lose all my dear map users?

BIBLIOGRAPHY

Cartwright W.E. (1988) Video Atlases As a Tool For the Decision Making Process, Technical Papers, Vol. 1, 7th Australian Cartographic Conference, Australian Institute of Cartographers, Sydney 1988, pp. 197-219.

Information Technology (1987) 48, p. 5.

Mundocart CD-ROM User Guide (1989) Version 1.08/9 Petroconsultants, London.

North G.W. (1988) Will Your Library Be the Spatial Data Information Center of the Future, Paper presented at the IFLA Conference in Sydney 1988.

Ochman P.G. (1988) Automated Map Retrieval. Paper presented at the IFLA Conference in Sydney 1988.

Olson J.M. (1984) Video Discs and Map Design, Technical Papers, Vol.1, 12th International Conference, International Cartographic Association, Perth WA, pp. 509-517.

Peterson M. P. (1989) Design Considerations in a Microcomputer program for Choropleth Mapping, Paper presented at the Conference of the International Cartographic Association, Budapest, Hungary 1989 pp. 5 (unpublished).

Planetary Data System (1988) User's Guide for the PDS IMDISP Program.

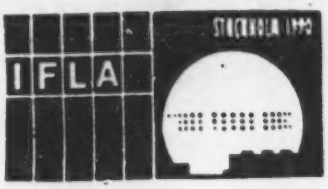
STR (1988) Supermap TM User's Guide and Reference, Version 2.0 1981and 1986 Australian Censuses, Space Time Research, Hawthorn Victoria, pp. 100.

The Domesday Project (1986) Publishers information.

Turk A. G. (1990) Towards an Understanding of Human-Computer Interaction Aspects of Geographic Information Systems, Article submitted for publication in Cartography.

WMB (1990) Microcomputer Mapping Software, Part II, Wisconsin Mapping Bulletin, Vol. 16, No. 2, March 1990, State Cartographer's Office, Madison, WI, pp. 4-5.

IFLA GENERAL CONFERENCE STOCKHOLM 1990



Division:

Section/RT:
Geography and Map Libraries

124-GEO-2-E

Map catalogue and graphic interface from the PC version of the Swedish National Atlas

by

Göran Bäärnhielm, Royal Library, Stockholm, Sweden

Wolter Arnberg, University of Stockholm, Department of Geography

For internal use only:

Meeting No: 131

SI: yes/no

IFLA 1990: Bäärnhielm & Arnberg, Map catalogue and graphic interface.

Abstract

Map Catalogue and graphic interface from the PC version of the Swedish National Atlas.

The National Atlas of Sweden, which is now under publication in 17 volumes, will be issued also in a PC version at a low price (estimated at 1000 SEK), in fact a mini-GIS (Geographic Information System) intended for schools, libraries and the general public. This PC Atlas will contain also a map catalogue, which provides a graphical search tool for maps, charts and images. The catalogue will contain all official maps and those catalogued by the Royal Library for the National Bibliography of maps. The use of a subset of the LIBRIS library database provides a natural link to further access to maps and charts in libraries and archives. Search in the map catalogue is initiated by filling in a screen form giving the search profile in terms of map series, date of information and search model: within a rectangular area, along a line or in a point defined by the user. The frames of the maps retrieved are displayed on a background map. Hardware requirements are an AT 286 or higher with 640 Kb RAM and 10 Mb hard disk space, EGA or VGA graphics and a mouse.

Authors:
Wolter Arnberg, assistant professor, Department of Physical Geography, Stockholm University (S-106 91 Stockholm), responsible for the PC Atlas project.
Göran Bäärnhielm, librarian at the Royal Library (PO Box 5039, S-102 41 Stockholm), responsible for the National Bibliography of maps.

BEST COPY AVAILABLE

Map Catalogue and graphic interface from the PC version of the Swedish National Atlas.

Göran Bäärnhielm, Wolter Arnberg

Introduction

At first, a few words of introduction and presentation of the Royal Library map catalogue.
In 1983 it was proposed that map sheets should be included in the Swedish National Bibliography. Cataloguing started at the Royal Library in 1985, as soon as cataloguing rules had been adopted and the corresponding MARC fields had been made operative. This project, thus, started out of the needs of the National Bibliography, not of the map collection. So it is natural that we are using the computerized cataloguing system LIBRIS, which is shared by the Swedish scientific libraries and is used also for the production of the Swedish National Bibliography. This system was developed in the 1970-s, it is meant for book material and isn't in all respects very suitable for map cataloguing; it is not, for example, a relational database, and ther is of course no graphics. But there is one advantage as against other similar systems: you can do two-level cataloguing, the upper level for single maps and series, the lower level for map sheets in a series or other multipart items. And it is in fact possible to enter a very large number of sheets in a map series, without the limit that exists in several other systems.

The annual maplist is printed as a supplement to the National Bibliography, and is published also as an offprint. The first was that for 1986, so this year the fourth maplist has been published. About 200 single maps and 500 map sheets from various series are catalouged each year. This is less than half of the about 2000 maps received annually as legal deposit, but the rest are considered to be of too little general interest to be entered in the National Bibliography.

It was decided early, on the advice of experienced colleagues abroad, to include geographical coordinates according to the AACR2 rules - also in a coded form - in the catalogue entries for the single maps and for series. These coordinates are now computed by the means of the grid on the map itself or by comparison with other maps containing such a grid. But coordinates are excluded for the map sheets belonging to series following the National Grid (with a few exceptions), because of the excessive amount of work necessary for computing them for hundreds of sheets, and because we have been waiting for an automated calculation facility by means of data delivered by the National Land Survey.

So the foundations for a coordinate retrieval of maps are there, to a certain extent, but we also need a program to do it, and this is a more difficult thing. To my knowledge, at present, very few libraries are doing this regularly.

For us at the Library, it started with the desire to represent on the computer screen a graphic index of a map series, with the possibility to "walk around" with a cursor among the mapsheets and have the corresponding catalogue information displayed at the same time in a window on the screen. Another desire was to provide our IMDOC search system with a search function for numerical coordinates.

The first thing would hardly be possible within the central LIBRIS system, which is run by a service bureau, but would demand PC:s as terminals with a

graphic application loaded locally.
The second thing might certainly be possible, but would require a certain amount of programming at the service bureau with the corresponding cost. And then you would still have the series maps, which have no coordinates.

We had just started looking around for other systems, when we found an announcement that the Swedish National Atlas PC-version would include a map catalouge with a graphic interface and including all the official map series. This would certainly be a possibility for us to get away cheaply with the coordinate retrieval and also to distribute our map catalogue to a wider audience than via the printed maplists. So our cooperation started around Christmas and is now well under way.

GB

The National Atlas PC version. From map to Geographic Information System.

Pictures are today important tools for the communication of information. The map is a special kind of picture.
In the literature, "map" is often defined as a graphic representation of spatial relationships and data. Robinson, in Elements of Cartography, discusses five different aspects of maps: geometry, technique, artistic form and perception, communication and costs.
The need for navigational aids on land and sea is the starting point for modern maps. So it is natural that cartography has for a long time emphasized geometry, technique and costs. In spite of this, never before have so many maps been produced, whose primary function is not for measurement but purely to communicate information.

Here I will emphasize the map as a means of information.

Thematic cartography is described in Elements of Cartography as a kind of geographic essay, where the goal is to show geographic connections between various phenomena against a background of spatial references like land-water-contours, roads, towns etc.

This description is quite congruent with ancient Swedish cadastral maps, which are perhaps an optimal kind of description with good geometry, illuminating sketches, descriptions of land-use and the carrying capacity of the ground. These maps provide a concentrated and lucid presentation, informative and artistically advanced.

Thematic maps of more recent date, for example geological maps, display text and picture separately. The comprehensiveness of the map is reduced and it becomes more and more a storage medium for data. The vegetation maps with their short description on the verso, and even more the tourist maps, display their information more accessibly.

The concept Geographic Information System - GIS - was coined in the middle 70-s, and a definition of it has not yet been firmly established. Usually GIS refers to a tool for handling, analysing and processing spatial information in cooperation between databases and presentation systems.

A map can be analysed, explained and discussed. In a GIS no maps exist at all - they are created by the system. Such a map is put together from various details to a totality.

With the help of a GIS I want to combine the different elements to be able to elucidate reality from different points of view. This synthesis puts a demand on the preceding analysis of the same reality, when it is transferred to my database. It is important to make the right choice and to choose the right classification, the right generalization, the right quantities etc.

A map deals with two fundamental elements of reality: position and qualities or attributes in the position. Maps are often classified with respect to scale, function or contents. For data stored in a GIS such a classification is meaningless. In a GIS position and qualities are utilized in the process; thus it is a possibly produced map that can be classified.

The greatest advantage of a computer is that it can store large quantities of data and quickly execute mathematical and logical operations. A computer, on the other hand, cannot understand what it does, or have a deeper opinion of what is being dealt with. Take a placename for example: To a machine it is identical with a number of signs in a certain order and connected with a certain position at printing.

But to the reader, like other symbols on the map, the names are stimuli that associate to our deep insight or knowledge within various areas. This is also the essential difference between data and information. The purpose of a Geographic Information System is to be able to manage the significance of data in a meaningful manner. That the data exist in digital form for map production is no guarantee for their usefulness in various connections.

The map production has, I believe, shaped a distinct view of Geographic Information Systems. This view has strong connections with how symbols of different kinds shall be collected on printfilms during map production. This model in fact is very little relevant for GIS. It is often done by locating different variables on different layers in a model. This quickly leads the thought to a presentational model and makes the observer believe that data can easily be treated simultaneously.

In a Geographic Information System we don't deal with maps but with data, which can be combined in different ways to a map or a table for a certain purpose.

A Geographic Information System can be seen rather as files of data in a bookshelf and a robot which quickly prints or draws the desired information. The files contain data - text and pictures - in a strictly standardised layout and with a common index.

With a standardised layout I mean not only the distribution of text and pictures on a page, but also that the data are described in a structured and formalised way, and that scales and quantities are defined.

A Geographic Information System builds on the creativity of the user, not that of the authors or data collectors.

I must create the maps myself. The systems today don't give me any help with artistic realiztion, tasteful colour-scales or the choice of meaningful presentation forms. This is certainly an intellectual challenge.

The PC Atlas is made from the data used for the printed National Atlas. But there is a great difference: In the PC Atlas the image dominates as means of

communication, and alternatives are offered that are lacking in the books: the materal can be displayed in a dialog with the users - schools, colleges, libraries, museums and other agencies - who can read in their own data, searches can be made in a more sophisticated way, dynamic processes can be illustrated etc.

As for the program, we have emphasized simplicity and therefore dropped a large part of the flexibility. The departure points have been to

- display data (images, maps, diagrams) on the screen
- compare data from different sources visually on the screen
- display chronological sequences
- perform simple analyses
- support the reading of the atlas books and the search for information

It is very important that both the program and the data is distributed in a package. There must also be compatibility between the users' possibility to make use of the technique and their access to hardware.

Contrary to other programs, the purpose is not to start with an empty screen and fill it with a map. You shall not need to, but have the possibility to make a specalised choice of areas, themes, colours and patterns.

Are there any ready-made programs that can be used for the PC Atlas? The closest parallel is the system that was developed for the Domesday Project in England. It builds on so called interactive video, which mixes raster images, diagrams, text and maps. It demands, however, a rather expensive equipment, which may be an obstacle for the distribution of the atlas to schools and among the public. Other existing programs are both expensive and complicated, demanding computer familiarity and training or are constrained by either vector or raster data.

Our aim is that anyone, without previous knowledge, shall be able to sit down at the PC and run the atlas program without any handbook.

To use the program as a tool for development, it needs a certain flexibility, which is contrary, however, to the demand for simplicity.

We have found that the data themselves are the most lasting part of this system. Hardware and software are rather shortlived, but the data collected represent a great expense but also a great value at present and in the future. Often the data have a great value at the moment of collecting; then their value decline, but may rise again, perhaps in another connection.

We also believe that the price of geographical data is proportional to the possibilities of using them. If you sell coordinates but no program, only specialist buyers can use them. Those wanting a map background for a presentation often have very small demands on the map itself. We hope therefore, that a program and data for a low price will contribute to better knowledge of geography and an understanding of how to use Geographic Information Systems.

The user chooses level of difficulty
The PC Atlas is structured in three levels according to the skill of the user.

Simple level
The aim is to display or study the atlas without any difficulties to reach the goal. The means is a graphic presentation that is managed by a point-read-scroll-method. We use ready-made images and simple choices.

Qualified level.
The aim is to be able to make a personal selection from tables. Available functions are for ex. to change variable, change region, change diagram form, change colour. In this level simple analyses can be made.

Advanced level
The aim is to make a personal PC Atlas by entering one's own data. This level is used for shaping the atlas, which is governed by different menus, commands and data structures, and presumes the availability of a database system.

The PC Atlas could be called a mini-GIS. But the purpose is not to create a complete GIS, and no support is given for topology or overlay analysis in vector form.

The system is governed by instructions for one screen at a time, with one component assigning values to variables and a final command.

Objects in maps and maps as objects.
A picture or a map consists of a number of components which cannot be further divided without losing their meaning. These basic elements are: point, line (open coordinate chain - the line itself has meaning), boundary (closed polygon - the environment on both sides has meaning) and text. We could also let a surface be an element if it consists of a raster image. A map can be seen as a combination of elements. A map can in its turn be seen as a new object. It is natural to arrange the information hierachically when we have classified different objects in the picture. If we want the map only as a background, there is no need to distinguish parts of it, but if we want to use the map for searching information, references must be connected in some way to the different parts of the picture.
The picture on a screen, with the same argument, consists of a number of windows or components seen as objects, which in their turn consist of objects down to the primitive element, the point, the line, the text. In the PC Atlas a "map" consists of a number of objects, simple or complex, a combination of different maps, each one a compound object. The structure is recursive - self-repeating.

The drawing component of the PC Atlas reads a list of objects. By editing this via the key to the map you can make new versions by simply adding or removing what you want from the key. Raster- and vector representation here are completely integrated from the viewpoint of the user.

The map of Sweden.
The map of the PC Atlas is based on the printed atlas map in the scale 1:700 000 and has the same contents.

It is of course a great difference between a printed map and one displayed on a screen. The resolution of the print is about 60 times larger. It is not possible to display the map on the screen with print quality.

Specific searches, e.g. for an area delimited by coordinates or names, can be very quickly done however, as also zooming in the scale and choosing the information in the map.

The map displays at the same time a guide map and a detail. In the guide map you can go to a smaller scale, in the detail to a larger scale. The map doesn't become better when you enlarge it, but more distinct.

There is a generalization function built in to avoid confused images: the map becomes more detailed when you enlarge the scale.

Data analysis.
There is a strong demand for simple analysis in the PC Atlas. That means that you can get more information from maps and statistics than by just looking at an existing map in the atlas.
The emphasis is on spatial distribution, progress in time and connection between variables.

Three main types of data, which demand different handling, are:
Raster data: for every square or pixel there are variable values which are displayed with colour scales
Area data: for fixed areas (communities etc) there are variable values which are displayed in maps either by giving different colours to the areas or by a bar-diagram or piechart for each area.
Point data: coordinates are given for a number of points. They can either show the occurrence or be tied to variables.

One of the cross-roads between keeping the system simple for the user and making an advanced GIS is how much freedom for analysis that shall be given. We have limited the possibilities for the moment to area data and raster data of the same type.

The advantages of the PC version consist in a number of functions lacking in the atlas book:
Search on parts of names
Measurement of area and distance
Coordinate transformations
Import of data
Thematic choice in the presentation
Map-catalogue

Map-catalogue
The map-catalogue has no counterpart in the printed atlas.
The purpose is to show which maps there are, and where, for any given point, line or area.
When calling the map catalogue I can define a search profile with regard to map series, edition year, scale, publisher/archive and area. The search begins when I define a point, a rectangle or a line on the screen map.

The limits of the maps are displayed on the screen, and I can get text information on the map publishers, map series title, catalogue number, scale, sheet number, year of publication, size etc.

Various map producers contribute to the catalogue by sending map data in machine-readable form. Catalogue records are also purchased from the Royal Library.

The user will also be able to import his own maps in the catalogue.
Catalogue data are entered as DBase records.

Hardware requirements are an IBM compatible AT 286 or higher (math processor is an advantage) with 640 Kb RAM and 10 Mb space on the hard disk, EGA or VGA colour graphics and a mouse.

It is our hope that the low price of the PC atlas (ca 1000 SEK) will make it an everyman's GIS and maybe the beginning of an national geographic information system. As digital mapping is in rapid development in communities and corporations, it is important that the schools will be able to show its possibilities and problems. A school campaign for computerised mapping and spatial analysis is extremely important to meet the demand for openness and public insight into decisionmaking, now and in the future.

WA

Conclusion

So this is the system which for the time being may function as a simple tool for searching maps of Sweden and as a graphic interface for our national cartobibliography. It is important that emphasis is laid on simplicity, so that it may be possible for the ordinary library visitor to use the system himself. To be sure, you had better be somewhat familiar with computers, pull-down menus, cursors, mice and the like.

For us at the Royal Library it is an important thing that the initiative has come from the world of geography, that is the map producers and most important map users, which are of course our main reference group for the accuracy and relevance of our map catalogue.

We believe that this will be a fruitful project of cooperation between the world of research and the library, and that it will contribute to the opening of an otherwise closed sector of society which is also the Library's objective.

GB

IFLA GENERAL CONFERENCE STOCKHOLM 1990

Division:

Section/RT: Geography & Map Libraries

128-GEO-3-E

DOCUMENTATION AND INTERACTIVE CARTOGRAPHIC SYSTEMS

by

HANS VAN DE WAAL

Information Cartography Consultant

1e Brandenburgerweg 53
3721 MC Bilthoven
The Netherlands

Keywords:
Cartography
Communication Formats

For internal use only:

Meeting No: 131

SI: yes/no

ABSTRACT

DOCUMENTATION AND INTEGRATED CARTOGRAPHIC SYSTEMS

The developments in computer assisted cartography seem to lead to Integrated Cartographic Systems. In an ICS several types of so called geo-coded information, like maps, remotely sensed data, and geographical information systems, can be combined into one image on the screen and manipulated in an interactive way. At the moment such systems are housed in one image processing instrument, but in the future several local ICS's can be consulted in an ICS network. This causes complicated documentation problems. Already difficulties in data documentation and the exchange of cartographic data in digital form seem to play a major role in the stagnation of the use of cartographic information.

Techniques and concepts, developed in the past two decades for the documentation of cartographic information, may also prove useful in the solution of problems in the cartographic information supply. A "Conceptual Model on the Documentation of Cartographic Information in Digital Form" is outlined. This is based on the stages in the cartographic information flow from original data to user, and follows the same structural concepts as the provisions for CM in UNIMARC.

A "Communication Format for the Exchange of Cartographic Information in Digital Form" is suggested. For the documentation of cartographic digital files "Documentation in Data" is suggested.

DOCUMENTATION AND INTEGRATED CARTOGRAPHIC SYSTEMS

I INTRODUCTION

Documentation is traditionally a recording activity: information is being produced and is documented in a later stage. Although, at the onset of computerization, documentalists were quick to adapt to new types of information and also applied the new possibilities energetically, the profession retained its somewhat trailing, secundary character.

In this article one of the starting points is that in computerized information supply the role of the documentalist is no longer marginal, but central. Right now, the obstacles delaying a breakthrough into the information era are mainly documentary in character. Techniques and concepts, developed in the past two decades for the purpose of description and retrieval, may also prove useful in the solution of problems in the information supply.

Although these concepts are applicable in a general sense, this paper is solely dedicated to the cartographic information supply in a computerized environment. The frame of reference from which it is written is formed specifically during the long period of cooperation in the development of the ISBD (CM), the provisions for CM in UNIMARC, the Dutch Union Map Catalogue, and the research project 'Interactive Cartographic Systems' of the Department of Cartography at the Geographical Institute in Utrecht.

II MODERNIZATION OF THE PAST

When distinguishing stages in technological expansion, a phase of technological innovation is always followed by a period when the new techniques are being used to perform the old methods more efficiently. This stage I would like to describe as modernization of the past. It takes some time before it is realized that the new potentials can be more fully exploited in a newly adapted environment with updated aims. For example: MARC was started as a means to reduce the cost of sending out the L. of C. catalogue cards by transferring the data onto magnetic tape. Only much later the subsidiary possibilities of digitalized descriptions were realized. In cartography digitalization began with mapdrawing via a database, and only later the emphasis shifted to processing of geo-coded data.

It is indeed remarkable that the factors delaying application of new innovations are often nothing but relics from past problems. Things that used to be important in documentation, such as: main entries, similar title descriptions to denote similar works, the pros and cons of central and decentralized information systems, are no longer of critical importance with the actual technical possibilities. Computerization offers so many ways that often not the technical state but the organizational state is the deciding factor.

The actual questions in computer assisted cartography show characteristics of a transitional period. Right now, we are still partly in the position of automation of the past, and new applications are not being effectuated as quickly as would be possible from a strictly technical point of view. New applications can be perceived, but the problems from the past still obscure the view into the future. Examples are the hesitant application of mapdrafting and mapdesign programs, the underesteem for remotely sensed data, and the continuation of cartographic systems that are strictly geo or subject oriented.

III INTERACTIVE CARTOGRAPHIC SYSTEMS AND CARTO-DOCUMENTATION

Yet, the future in cartography has heralded itself clearly in the form of integrated cartographic systems (ICS). Several countries already possess data systems combining multitudes of data of various forms.
Really integrated cartographic systems, integrating any kind of geo-coded data into one image via an intelligent open network, are not yet fully at hand. Still, modern GIS, CARTO/CAD and RS data go a long way in that direction, because they contain not only the usual processing methods for one of the latter categories, but also for other kinds of data. However, more often than not this is only possible within the one environment, and data have to be rendered in a format that enables GIS, CARTO/CAD or RS image processing. Such pre-ICS systems limit the specific advantages of the individual processes, and a free choice in data storage and data processing is not possible. They are clearly a transitional step between static map and dynamic image produced interactively from several kinds of cartographic information.

In order to obtain an insight in the needs of the future ICS-user and the problems confronting him, it is useful to have a closer look at the pre-ICS systems. At the moment, application of operational digital cartographic systems seems to stagnate. Difficulties in data storage and data communication seem to play a part in this, and both are aspects that will have to be solved on a higher level than that of cartographers and geo information specialists. But where do we find a cartographic vision that will point the way for developments in the use of geo coded information. We can not speak of a genuine break-through, although a lot of headway has been made in the field of computer assisted cartography, such as GIS, RS-techniques and image processing.
Our profession seems to lack direction, and this is one of the reasons why cartography runs the risk of losing terrain to specialists from other application disciplins that have mastered the computer. Such 'trespassing' proves that cartographic solutions are required, but not forth-coming. And the danger of amateurish image-juggling grows, now that application has become more usersfriendly and the resulting image more beautiful. These spectacular products however, often have very little informational value, because they do not specify what is being represented exactly, and because the cartographic representation is often faulty. To cartographers, mindful of a responsible representation where information is rendered to provoke an accurate suggestion, it is first and foremost to specify just what it is that is being represented.
Within an ICS, even within a local system, this is a complex matter because of the diversity of basic data and the variety of processes. When the user has no grasp of these, he will feel lost in an overwhelming flood of data and processes, and will need to rely on the help of the (carto-)documentalist. This functionary could also be employed against another obstacle on the road to usersfriendly ICS systems: the standardization of cartographic information systems. Here too, the contribution of a carto-documentalist could be of great value.

It is not my intention to suggest that just the solution of a number of technical problems, will result in an optimal cartographic information supply. Social and organizational matter play a role too and can be delaying factors. This article however, is limited to the carto-documentary aspects where a fruitful cross-pollination could take place in order to solve part of the technical issues.

IV STANDARDS AND STANDARDS

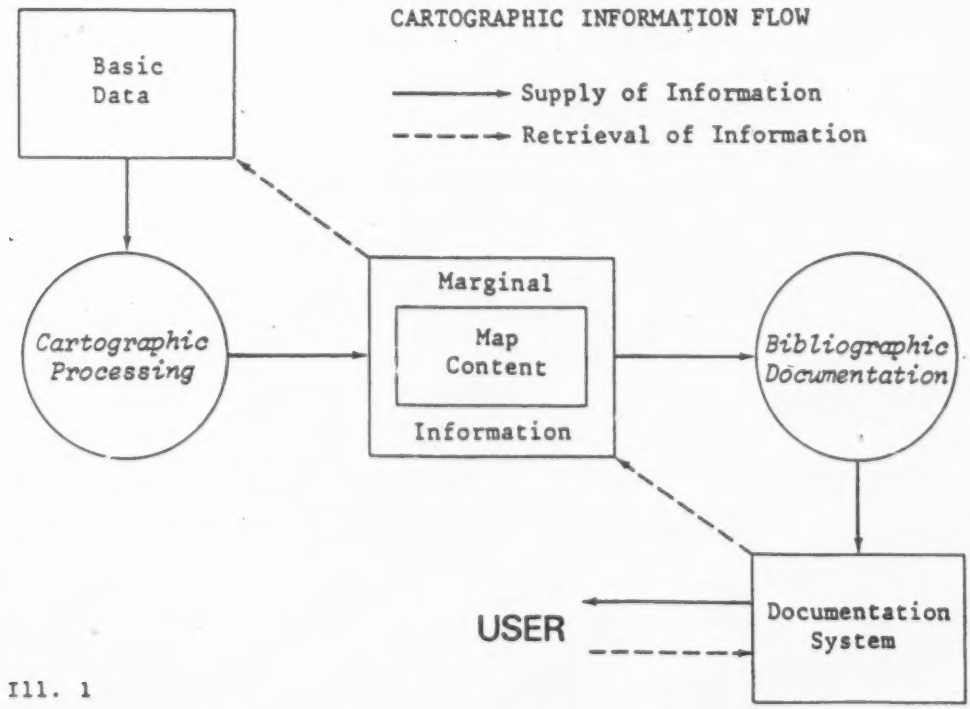
As far as I know, there is nowhere a real break-through in the development of a standard facilitating cartographic communication via digital mediums. Business companies, institutions etc. have engineered standards, but these are not widely accepted. Strikingly, such standards designed for the exchange of cartographic data all aim at maximum uniformity. In a computer environment where data conversion is relatively easy, the wisdom of this is questionable.

Standards concerning information can be distinguished in two groups: unification standards and communication formats. The former tries to record matters in such a way that in crucial aspects the products show conformity. The latter leaves as much freedom as possible and limits itself to

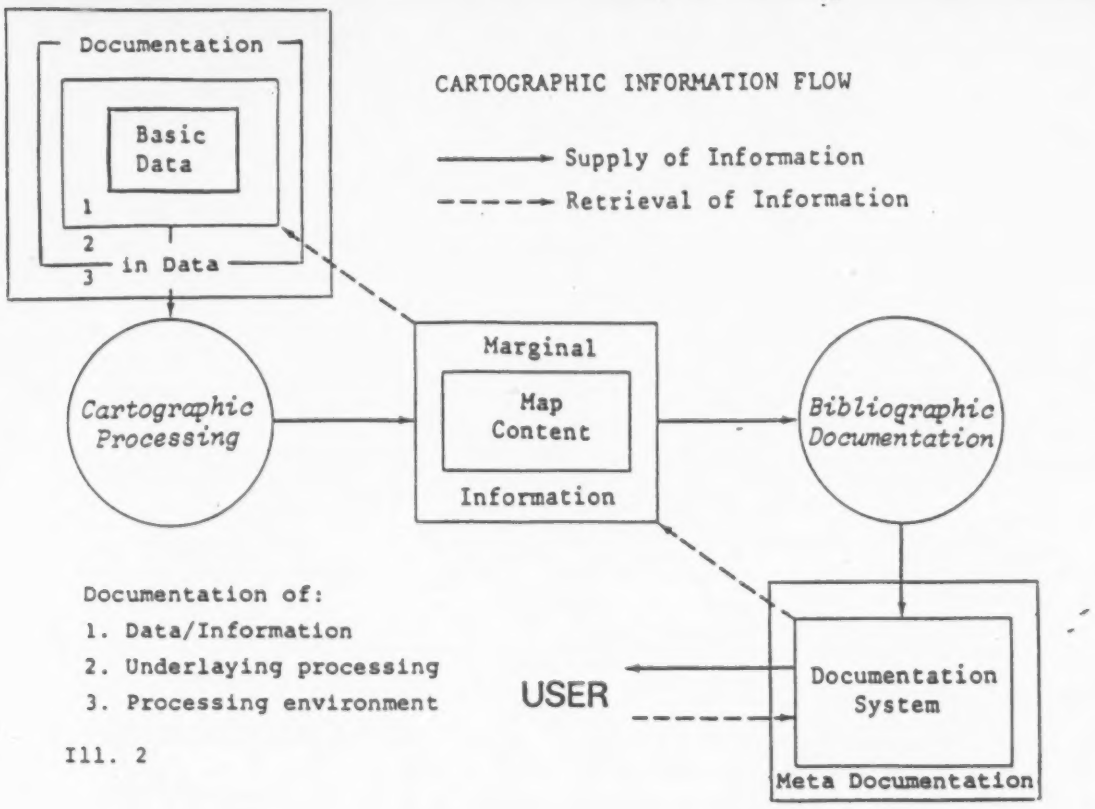
those points necessary to e.g. convert information from one system into the other. Uniformity is the obvious choice when, for instance, one firm with one system dominates one certain market, or when users have no reason to be interested in the structure of the data.
A different choice will be made when, apart from a certain need for uniformity, there are also valid reasons to maintain specific differences. Such reasons can be economical interests or psychological factors like tradition and need for individual identity. The more aspects involved, the less chance of finding a unifying factor. In such cases, a communication format compromises between the freedom to act as one likes, and the conformity necessary in communication. Most often, a willingness to stick to the rules of the communication format can be reached, whereas the unification standards often calls for insuperable objections.

V UNDERLAYING CONCEPTS

Because maximum freedom is desirable, a well defined structure is a sine qua non for the communication standard. It is essential to design a model in which all features can find their place. In order to enhance flexibility, the various elements need to be as small as possible and uniquely defined. In practice it may be advisable to define the contents of each element according to a fixed system, for instance via a coding system. Apart from the codes prescribed by the chosen standard, it even may be wise to offer a possibility to describe the contents of elements in an individual way. Generally speaking, we can state that there are data which, by (cartographic) processing, become a map or any other cartographic form of information. A user consults a documentation medium like a catalogue or a carto-bibliography, in order to retrieve a map. If the marginal information on the map is complete and accurate, he then will be able to interpret the map image.
This information flow from data to user, as represented in ill. 1, gives the situation if there is a hardcopy map or e.g. a RS image.



Ill. 1



Ill. 2

Some users will be interested in the original data from which the map is compiled, but this does not affect the depicted flow of information. In such cases the original data in their turn become the consulted information.

In a computerized environment matters are much more complicated which is illustrated in ill. 2. There we have a user behind a screen, who can manipulate several sources of information to form one image with an unlimited number of combinations. But there is no cartographer to explain in the marginal information what is depicted and to provide him with keys through a legend. If the user can not trace how he manipulated the data and does not know exactly the all-abouts of the underlaying data and processes, he can not give an accurate meaning to the shiny image on his screen. More so than in a non computer environment, it is crucial to know the details of the system in which the processing took place. The hardware and software can be of great importance for e.g. the accuracy of the resulting images. This means that all levels, from original data up to the final product, are to be documented extensively. Some kind of marginal information is needed, not only for data and information, but also for factors belonging to the environment.

The original data and the information are surrounded by three shells. The inner shell gives information about the data, like a legend for the map content; the middle shell describes the underlaying processing; the third shell describes the environment in which the data were created. The environment includes name, hard- and software characteristics and communication properties of the image system. Also details like names of persons involved in the production, may be important for the documentation of the environment.
It is essential to link the documentation of data or information as directly as possible to the data themselves. If the documentation can be physically connected to the data, scores of retrieval problems can be avoided. It may be very attractive to 'document in data', as a variant on 'cataloging in publication'.

The kernel of the documentation system consists of:
- descriptions of information,
- the retrieval system, and
- the supporting documentation files.

By using linking techniques, it is no longer necessary to file documentary elements in the specific documentation system: they can be filed together with the pertaining data. On the other hand, if the documentary system is integrated into or linked with the cartographic system, it is no longer necessary to record again and again all details of a certain configuration used for the processing of data. In such a case, it suffices to refer to the supporting files of the documentary system.
The shell around the documentation system gives details about its properties e.g. the used documentation standards.
Just as several consecutive steps can be distinguished in processing, so it is possible to document on several levels. The question whether one wishes to have documentary data of all levels available centrally, becomes rather unimportant by using linking techniques.

VI CONCEPTUAL MODEL ON THE DOCUMENTATION OF CARTOGRAPHIC INFORMATION IN DIGITAL FORM

In the conceptual model on documentation of cartographic information systems depicted below, a first ordering is determined by the different stages in the information flow. Next all elements are described and analyzed into their smallest components. Only thus will a logical structure be set up and can problems be avoided in the many instances where elements are closely interrelated. In the sequence from original data to final product a number of different stages are being passed, where the cartographic information resulting from one stage forms the basic data of the next. Here too, it is absolutely necessary to keep the documentation of the various stages strictly separated.
The analysis into elementary components corresponds well with the structure of those UNIMARC fields related to CM. The same principles served as starting-point. The structure of a model for description of cartographic databases could be as follows. It should be stressed, however, that this is only a first concept, and the completion of the categories only serves as an example.
Parts of a documentation system for cartographic information in digital form

I. DATA

Ia. Content:
- Legend
- Bibliographic description
- Subject
- Area classification
- Other retrieval elements

Ib. Underlaying processing:
- Preprocessing:
  - geometric correction

Specially for CAD and GIS:
- overlaying
- buffering
- interpolation
- generalization
- statistical calculations

Specially for RS-image processing:
- radiometric correction
- filtering
- structure analysis
- classification

Ic. Environment:
- Name and characterization of the system
- Configuration hardware
- Configuration software
- Type of image processing
- Format input data
- Format output data
- Communication facilities
- Applied standards, procedures

II. CARTOGRAPHIC INFORMATION

Like the elements of the processed data

III. DOCUMENTATION SYSTEM

IIIa. The system itself
- Bibliographic description of the chosen entity
- Retrieval systems of the chosen entity
- Supporting files for the description of cartographic systems
- Supporting files for the description of cartographic contents
- Supporting files for the subject classification
- Supporting files for the area classification

IIIb. Meta Documentation
- Description of the documentation system
- Cataloging rules
- Format of input
- Format of output

It goes without saying that the general user or system operator will not be able to update all these elements, especially since they represent only a part of a complete documentation. But here the possibilities of a modern documentation system will make things easier. Especially the linking techniques, facilitating efficient implementation of data once recorded, reduce the documentation efforts considerably. On top of this, an intelligent usersfriendly system can be expected to generate part of the documentation automatically by registering e.g. all processing.

The elements related to data and information should best be stored in specific 'documentation in data'-fields. For the documentation system itself, this is less obvious. It depends on the structure of the cartographic database and on the measure in which the base should be accessible for other parties. In a purely documentary system also, it is possible to generalize the several (documentation) levels by using linking techniques. In this way it will be possible to document on the level of specific elements, specific groups of databases, or databases of specific organizations.

VII PLANS FOR FURTHER ACTION

The concept mentioned before, will be implemented with facilities for the documentation of cartographic information, varying from simple cartographic databases to integrated cartographic network systems. This will be realized under the auspices of the researchproject Dutch Union Map Catalogue, directed by the Cartography Department of the University of Utrecht. It goes without saying that it will involve also the Royal Library, where the operational section of the DUMC is located.
It seems feasible to link the project to some European kind of cooperation, in order to stimulate the exchange of cartographic information at the EC-level.

Depending on the reactions to this paper, which will be circulated in a slightly adapted form among a wider public of cartographers and carto-documentalists, it will be endeavoured to cooperate with those who, from a cartographic point of view, are involved in standards for the exchange of cartographic information. After discussion with members of the Standing Committee of the IFLA Geography and Map Libraries Section, this paper will be sent to members of the IFLA/ICA Working Group on Documentation. Also the US National Committee for Digital Cartographic Data Standards will be contacted: its chairman, Prof. Harold Moellering, has been inducive in the writing of this paper. Close contacts with geo-data specialists are very important too, not only because of their cartographic expertise, but also to help support projects such as 'Documentation in Cartographic Data' and a 'Communication Format for the Exchange of Cartographic Information in Digital Form'.

The DUMC system was set up according to UNIMARC principles and at that time, the provisions for CM were tested within the DUMC. In the cartographic sections of UNIMARC it was not foreseen that extensive and complex provisions for documentation of modern cartographic computer systems would be needed. Another problem is that UNIMARC knows only provisional fields for computer files. If UNIMARC should be kept functioning in the field of integrated cartographic systems, then considerable extensions will be necessary. The Geography and Map Libraries Section might consider to take initiatives to this end.

163-GEO-3-E
1

HyperCard - Information storage and retrieval in a map library

C.K. Chu
Department of Geography & Geology
Univeristy of Hong Kong

Cartobibliographic information on maps, aerial photographs and satellite imagery and bibliographic information on books, pamphlets, journals, dissertations, video tapes is entered into the computer and stored as different stacks (files). The cards in the stacks can be fully cross-referenced and linked dynamically to cards in different stacks or even to files in different applications by means of buttons.
One major area of exploration is to find ways to enable a user to retrieve information regarding the existence of certain map sheets or scenes of imagery or photos that cover his area of interest. It would be too demanding if the user has to input coordinates to retrieve information. It is much simpler if he can point to locations or circle portions of index map or key in certain parameters, such as date or subject matter for the search. However, the database would have to record the coordinates of at least one corner of the map or the principal point of an aerial photograph.

THE OBJECTIVES

At present much of our staff time is spent in helping users find out what is in the collection that would best meet their needs. In order to make the search effective, the staff member has to be very familiar with the collection. This knowledge takes a long time to acquire. The main drawback of the existing card catalogue is that cartobibliographic information, no matter how detailed, is far from adequate in retrieving information about maps (especially map sheets in a series), aerial photographs or satellite imagery which form the bulk of our collection. After ascertaining that a particular map series, such as the "Interantional hydrogeological map of Europe" is entered in the card catalogue, he still needs an index map to find out which sheet covers the place of interest and then consults a separate holdings list to make sure that our library has that particular sheet. Sometimes it may be necesscary to go directly to the filing cabinet to find out.

Our aim in attempting to automate the Map Library catalogue is to find a cohesive way to handle information in a quick, useful and friendly manner so that more people, both staff and students, will be encouraged to make better use of materials in our collection. At the same time, it is hoped that after the whole system is fully automated, we can save staff time in cataloguing and answering reference enquires. To achieve this end, users must find the system easy to handle, and they should also be able to process the records in any manner they like, as for example, obtain a printed copy of records searched or an index map to a map series.

It is not our objective to have the computer produce printed text records (i.e. the familiar 3" x 5" cards). It is not intended to integrate machine readable records into the general card catalogue. Once all cartobiliographic and bibliographic entries have been converted into machine readable form, the card catalogue has to be abandoned. This will

Mbe 131.

save much staff time in making multiple copies of the cards and interfiling these into the card catalogue. Users of the automated catalogue will also be able to save much time in searching for materials they want. In the traditional card catalogue (whether a dictionary catalogue that holds all types of entries, an author/title catalogue or a subject catalogue) we are forced to search for information in an alphabetical sequence. In an automated catalogue, we can search by a variety of approaches. While browsing in HyperCard the user can jump at will to related ideas and the path is determined by his needs and interests. What we want in essence is an ability to move at will among many pieces of information.

CONSTRAINTS

The Map Library in the Department of Geography & Geology is small, with 20,000 sheets of maps covering the world and over 10,000 prints of air photographs (mostly of Hong Kong). Because it is a departmental set up we cannot buy very expensive equipment or software. The best we can afford is a personal computer system which is easily managed by staff members (only two) in the Map Library. Neither can we afford to employ a programmer to customize any commercially available database management software to suit our needs. The Map Curator, who is not a trained programmer, has to do the customization herself. She cannot devote too much of her time to this purpose either since she also has teaching duties to perform. All this means an easy to use development tool is needed to turn our ideas into reality with little time and effort.

The printed word is not necessarily the best means of documentary transmission in cartographic collections. Multi-media transmission in the form of text, numerals, graphic and video images (sound may be included) is often more suitable for cartographic materials. Therefore we require a database system that allows all different forms of data (text, graphic, video, sound) to be integrated. The search mechanism for this database system must be efficient. The most important factor in a searching mechanism is speed. Two other considerations are the memory size of the database and whether the search mechanism produces only the objects wanted. Databases tend to change as the collection expands or other search criteria become essential. Global changes are necessary. How easily a programme lets you make design and content changes is crucial to saving time and frustration.

After experimenting with the MISER relational database management system in the University's Sperry mainframe machine and using dBase III in an IBM/PC AT compatible machine to develop an automated information storage and retrieval system for the Map Library in the winter of 1987 it was finally decided to do the job with an Apple Macintosh machine, using HyperCard as the main operating and database software. In January 1988 a Macintosh II with 1 MB RAM and a 40 MB hard disk and a RGB colour monitor was bought with a research grant from the University. HyperCard came packaged with the

machine. A few months later a Macintosh SE with 20 MB hard disk and an ImageWriter II became available to the library's research assistant. A few other applications for the Macintosh, such as ThunderScan, SuperPaint, MacDraw, Excel and MapMaker were acquired for teaching purposes. There is access to an Apple Scanner, a Dest Scanner and LaserWriters in the University's Computer Centre. Work started in earnest in the summer of 1988 when I obtained money for the employment of a research assistant for a period of three months.

Although we have two machines available for developing the information storage and retrieval system in the Map Library, it is essentially a single-user, single-machine system. The machines are not net-worked. The database and the other applications reside on a single hard disk physically located at the same machine.

Although we hold materials in the form of books, journals, pamphlets, video tapes and colour slides which can also be entered into HyperCard, the main concern of this paper is the storage and retrieval of information related to three categories of materials: maps, (either single sheet maps or multiple-sheet map series), aerial photographs and satellite imagery which are described by ISBD(CM), and classified by the same classification scheme (LC G Schedule). The other types of materials in our collection are classified according to DC following the practice in the University of Hong Kong main library.

A HyperCard stack can be heterogeneous (having different backgrounds with a different number of fields) and the size of a stack is limited only by the amount of memory available in the system. We prefer a number of small stacks organized hierarchically into different folders because we find small-sized stacks much easier to maintain, and search can be faster and more precise. Different stacks are created for each type of material. In the case of maps, stacks can be divided into Hong Kong and non-Hong Kong maps. Non-Hong Kong maps can be grouped by continents and so on. Furthermore, in a stand alone system small files (less than 800 K) are much easier to copy from one machine to another than files that exceed the capacity of one double sided floppy disk.

HyperCard was originally conceived as a user environment. We use it as a visual database and operation manager. Other applications can be launched from within HyperCard by means of handlers in scripts. HyperTalk, the scripting language which is very similar to natural language, is easy to learn. HyperTalk uses message passing to communicate between buttons, backgrounds, and fields. Buttons on the screen can simulate actions or actually affect the real objects. Scripts can be written to do mathematical calculations, conduct complicated search for text or numbers, ask questions or supply answers, without going to the main control loop for guidance.

MAP LIBRARY STACKS

Each stack in HyperCard is a separate Macintosh disk file. You can see it as a HyperCard document in the Finder. The Map Library (Home) Stack may be seen as the overall schema which establishes the general flow of the data-management task. When we open HyperCard by double clicking its icon the first card in the Map Library (Home) Stack will appear.

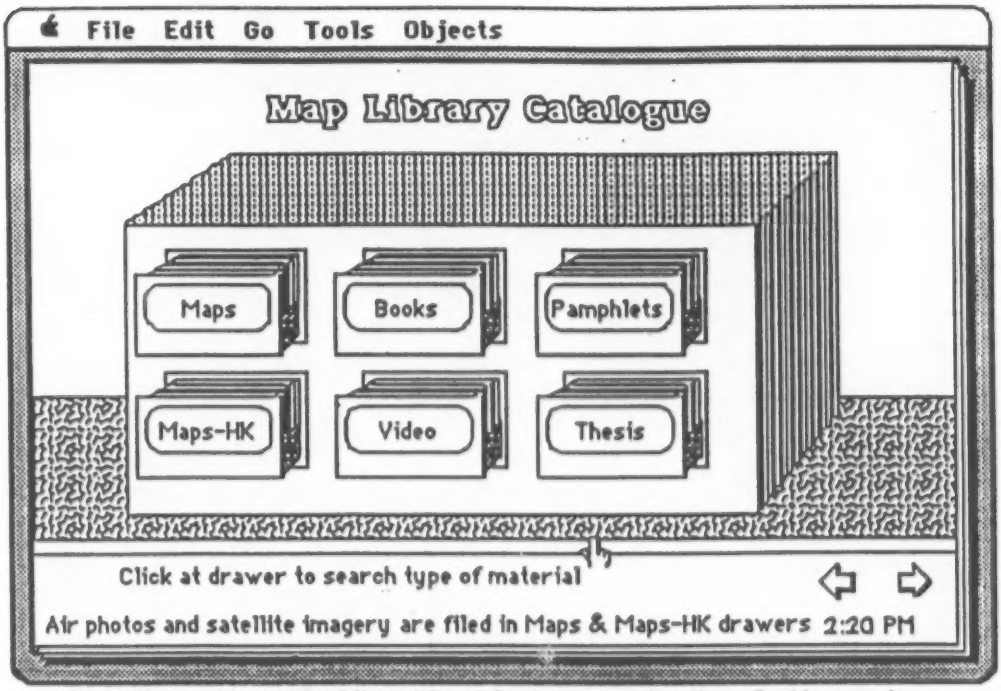


Fig.1. First card in the Map Libary (Home) Stack appears when HyperCard is opened.

Clicking at different buttons hidden under the catalogue drawers will instruct HyperCard to open the stack for the type of material you would like to search for information. Then you can key in the Find string (words, numerals in any combination) and check the boxes to set criteria for the search. Once you click the Search button with the mouse, the search starts and HyperCard will display the first card with information that matches the Find String. If no card in the current stack matches the Find String, a dialog box appears with the message.

"This stack does not contain" and the Find String.

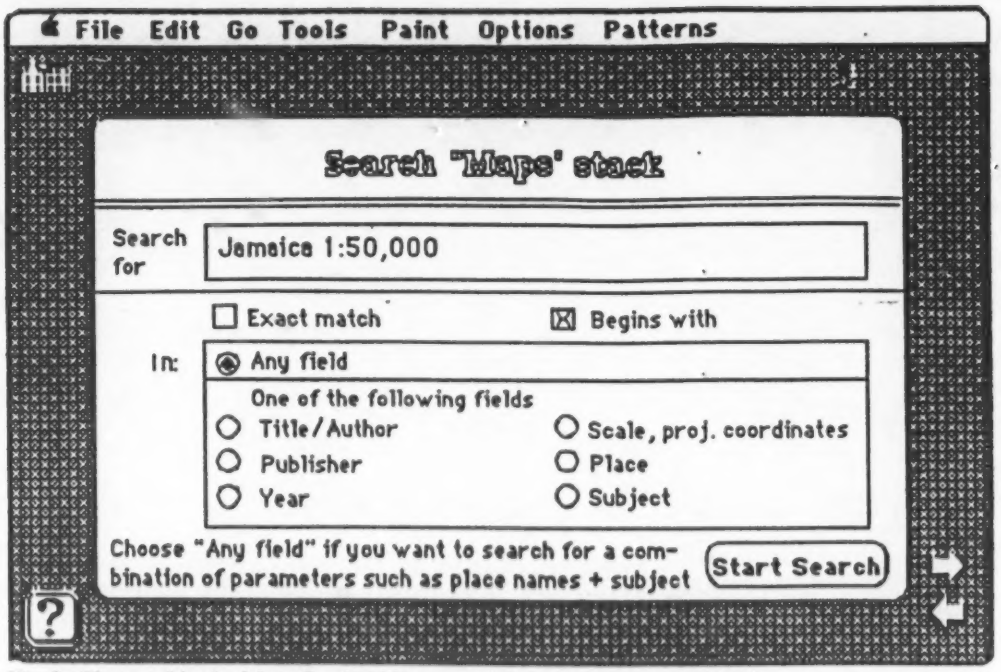


Fig. 2. First card in the Maps Stack will prompt the user to set search criteria.

THE MAPS STACK

By following ISBD(CM) stipulations, the cartobibliographic records could be used in the international exchange of bibliographic records when exported as a text file. However, we are not providing the definitive record for international exchange.

While designing the Maps stack (the stack holding records of maps, air photos and satellite imagery) we follow ISBD recommendations in "... requirements for the description and identification of such materials, and assigning an order to the elements of the description," but do not follow all the specifications of punctuation for the description. ISBD(CM)'s stipulation that each area, other than the first, is preceded by a point, space, dash, space (. _ .) is ignored because in HyperCard Map Library stacks each cartobibliographic area would occupy a different rectangular text field. Series statements are not enclosed by parentheses. However, when needed these can be easily supplied by means of a button with a handler to instruct HyperCard to put in the required punctuation marks. This is useful if you want a printed text copy of the carobibliography. What follows is a button script to put the ". _ ." punctuation at the beginning of fields:

```
on mouseUp
  repeat for the number of cards
   repeat with i = 3 to 7
     Put ". _ ." before first char of field i
   end repeat
   go to next card
  end repeat
 end mouseUp
```

Fields are strictly for text. The field boundary may be transparent or shown as rectangular boxes. Every thing in a field is stored as a text string. HyperTalk will discern from the context whether it is text information, numeric information, date and time information, or some other format of data. The number of background fields or card fields may be limited by size of card and sizes of boxes, related to what and how much information should be viewed at the the same time. Actually hidden fields may be used to hold information not frequently required. These fields can be shown at the click of a button.

There are ten background fields in the Maps stack:

Field 1	Call number (transparent, box boundary lines not shown)
Field 2	Title/author (scrolling)
Field 3	Edition (transparent)
Field 4	Mathematical data (transparent)
Field 5	Publisher/printer (transparent)
Field 6	Physical description (transparent)
Field 7	Series (transparent)
Field 8	Tracing (Not ISBD (CM) field) (transparent)
Field 9	Note (Scrolling)
field 10	Standard number (transparent)

Two fields, the title/author field and the note field are scrolling fields to accomodate long text strings. Sometimes long descriptions are required for parallel titles in more than two languages. In certain cases the statement of responsibilty includes extensive names of coporate bodies expressed in a hierarchical form which run into many lines. When the note field is used for holdings information of a map series, certainly two or three lines will not be sufficient. Actually you can enter more information into a field than the maximum number of characters shown on the card. For example, the publisher/printer field is given two lines. At the end of line two you may continute to key in more information, but the rest of the character string will not be shown. However, if you delete some characters in the first two lines what comes after will automatically appear to fill in the space. You can copy, cut or delete characters not displayed by extending the selection box beyond the lower right corner of the field.

Both the number and order of fields in the background or card can be easily altered without affecting the information already entered into the fields. The same is true of other field properties such as font type and font size.

For records that need to be amplified with index maps and holdings lists, card buttons provide linkages to cards in different stacks or files in different applications. When an application is opened from HyperCard the first time, the user has to show the path which will be recorded in the applications card in the home stack. Once the path is established, next time you open another file with the same application HyperCard will go to that application immediately.

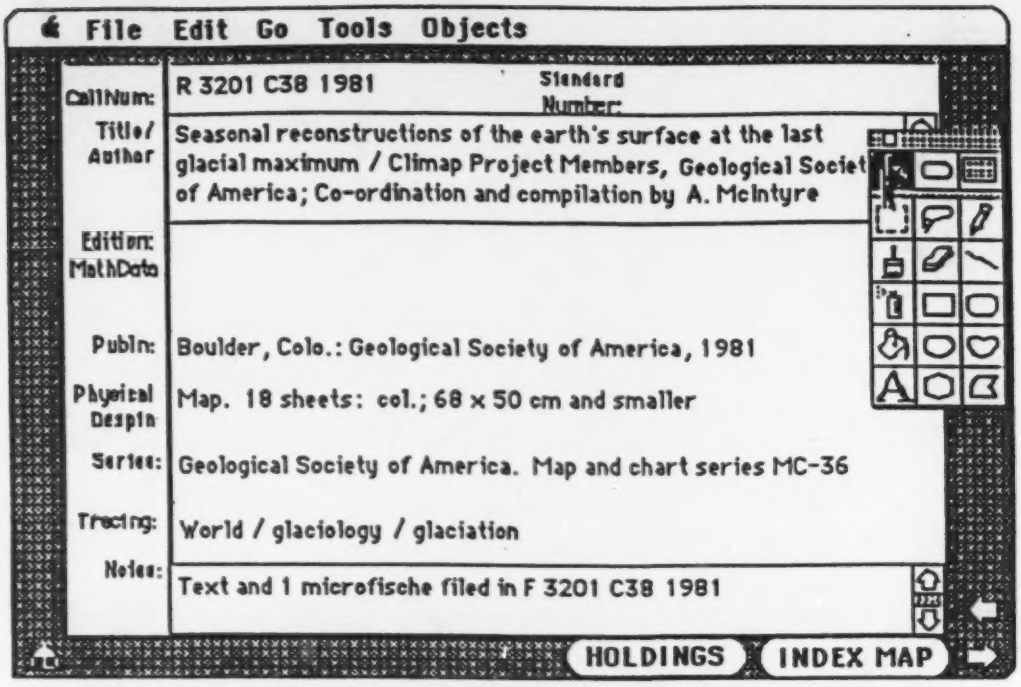

File Edit Go Tools Objects
CallNum:
R 3201 C38 1981
Standard Number:
Title/ Author
Seasonal reconstructions of the earth's surface at the last glacial maximum / Climap Project Members, Geological Societ of America; Co-ordination and compilation by A. McIntyre
Edition:
MathData
Publn:
Boulder, Colo.: Geological Society of America, 1981
Physical Despin
Map. 18 sheets: col.; 68 x 50 cm and smaller
Series:
Geological Society of America. Map and chart series MC-36
Tracing:
World / glaciology / glaciation
Notes:
Text and 1 microfiche filed in F 3201 C38 1981
HOLDINGS
INDEX MAP

Fig. 3. A card from the Maps stack. The tool box is shown with the browse tool selected.

INDEX MAPS

HyperCard excels at compact storage of graphics and it teams up well with scanned images. Maps on paper or diazo transparencies can be converted to computer image by scanning. The scanning devices tested are ThunderScan, AppleScan and Dest PC Scan.

1) The ThunderScan package includes a scanner cartridge and the software. The scanner cartridge is set into the ribbon cartridge deck. When the scanner is turned on, it moves back and forth across the page translating each point into a dot corresponding to one of 32 gray-shades, producing a gray map consisting of thousands of dots. The resolution is 72 dots per inch, the same as that of the Macintosh SE screen. After scanning you can clean up the image with the pencil, eraser and Fat bits tools. The changed image can be saved as a Paint, Scan, PICT, TIFF or EPSF document. You may copy the scanned map to HyperCard directly if it is of the right size. Editing can be performed with the graphic tools in HyperCard. If you need some transformation, such as changing the scale or reorientating the image it is much better to copy it to SuperPaint, and then do the editing there before transferring it to HyperCard by copying and pasting through clipboard.

   If you want your index map in a format larger than the size of a HyperCard (4.75" x 7 ") or that of a SuperPaint document (8"' x 10" for SuperPaint 1.1) you can join sections of the maps scanned separately to form a larger map either in MacDraw or SuperPaint 2.0. If you have SuperPaint 1.1 and MacDraw 1.9.5, then you need to do the editing on the bitmap image before copying it to MacDraw. In MacDraw you can

add objects such as lines, rectangles, curves or lettering to the map, but you cannot edit the bitmap image. After the big map is assembled it is not possible to select only a section of the map for copying to HyperCard. The entire big index map has to be viewed to determine which are the sheets that cover your area of interesest. Monitors with screen size bigger than 13" are preferred for the viewing of large maps. In most cases ThunderScan images are satisfactory except that it takes a long time (about 30 minutes for one 8" x 10" map) and the ImageWriter makes a lot of noise while scanning.

2) The Apple Scanner comes with two pieces of software known as *AppleScan* and *HyperScan*. You can use HyperScan to create index maps with ease. Maps can be scanned directly into a HyperCard stack with HyperScan. The scanner glass measures 8.5" x 14" and the scan area rectangle can be adjusted. This rectangle defines the edges of the card where the scanned image will appear. When the rectangle is resized, the scanned image remains the same size as that of a card. This means the scale of the scanned image can be adjusted by resizing the scan area rectangle. When the scan area rectangle encompasses an area of 8" x 12 " on the scanner glass, the scanned image is reduced to 4.75 " x 7" only. You can also use advanced commands such as "Scale" or "Scale <percent>" to set the rectangle on the portrait card or landscape card to an exact percentage between 7 and 400. "Scale" allows you to stretch the rectangle beyond the borders of the card if needed. The limitation of HyperScan is that the size of the image cannot be larger than that of the card. Very often one map has to be dissected into many sections.

   AppleScan produces higher resolution (300 dots per inch) graphics. The scanned image can be copied and pasted to FreeHand to form the background layer for tracing. Such high resolution graphics take up a lot of memory due to the high density of dots. If maps are created mainly for viewing on screen, and are rarely printed with a LaserWriter, it is not worth the extra memory taken up by AppleScan files. Sometimes when the lines in your original map are not well defined, HyperScan may not be able to pick up all the lines. In this case it is more satisfactory to scan with AppleScan at 300 dpi resolution. However, when you transfer the scanned image to HyperCard or SuperPaint the file will be compacted. For small memory size systems with less than 2 MB of RAM, it is not recommended that index maps be created with sophisticated drafting and illustration applications such Freehand or Illustrator 88.

3) The Dest PC Scan 1000 in the Computer Centre is connected to an IBM/PC AT compatible machine and an HP laser printer. Publish Pac allows maps to be scanned at 300 dpi and saved as TIFF files. These files have to be converted to Macintosh files in

binary mode before they can be read by Macintosh applications. When scanned maps were placed into SuperPaint documents a lot of details was lost. With Text Pac (CRO software) in the system it is possible to scan text from holdings lists in large quantities. The text files can be converted to Word or MacWrite documents by MacLink Plus.

MapMaker can utilize digitized boundary files in ASCII format. If you already have some map data files in vector mode, it is possible to import such files into MapMaker and then edit the files to create the necessary maps. MapMaker documents are smaller than 8" x 10". The plotted maps can be copied to SuperPaint, MacDraw and other Macintosh applications.

One Macintosh SE is connected to the University's mainframes. The software Mac240 enables emulation of a tektronix terminal to display maps generated by Calform or other graphic packages loaded in the mainframes. These maps can be transferred to Macintosh applications such as SuperPaint or HyperCard by means of the clipboard. The limitation is that these maps are in bitmap mode and cannot be rescaled without distortion.

Most of our index maps were created in SuperPaint which has a draw layer and a paint layer. Objects such as lines, rectangles, circles, ellipses are much easier to create in the draw layer where they are easily manipulated to reach the desired effect. When satisfied with the result these features can be copied to the paint layer. The reason for copying draw objects to the paint layer is that only bit-mapped images can be copied in sections selected. Sometimes a 8" X 10" map is creted in SuperPaint and then copied in sections to several cards in HyperCard. Drawn objects in PICT format must be copied entirely. If the drawing has to be rescaled, the rescaling should be done before editing, e.g. fill in patterns, add sheet lines, lettering etc. There are card fields in HyperCard index maps. These fields can be used to hold the call number, the series number and even title of the map series. These fields are hidden by the graphic layer. Text is entered into these fields by the PUT command. You can open the message box and type "Put "series HP2.5C" into card field 1". Text and numerals in hidden fields can be searched by the Find command, therefore including such information in the index map cards will facilitate location of maps in a large stack. You can find index maps for series HP2.5C quickly by typing "Find "HP2.5C"" and pressing return. HyperCard displays the first index map for this series. The text of this field is obscured from view and you can display it by typing the command "Show card field 1" and pressing return.

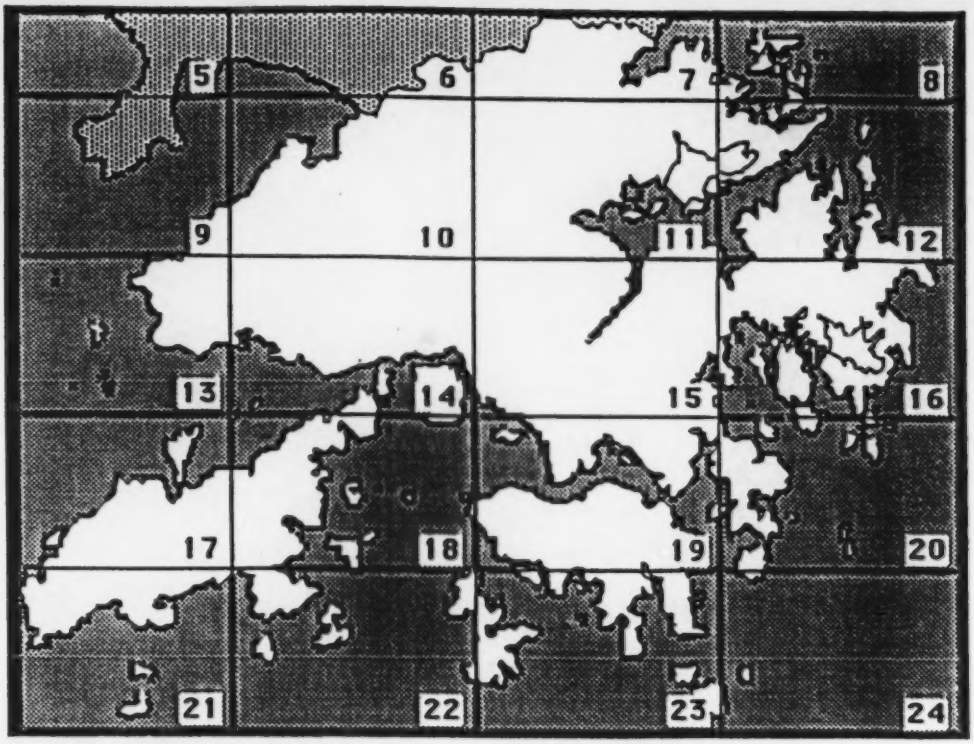


Fig. 4. Index Map careted with SuperPaint and then copied to HyperCard

HOLDINGS LISTS

Holdings lists for map series can be created in spreadsheet form with Excel. You can open Excel from within HyperCard. The problem is that once you click a button to open an Excel file, control is handed over to Excel and you have to search for information by turning the worksheet into a database first. This makes things a bit complicated for users not familiar with Excel. The advantage of using Excel is that you can create much larger tables, while the length of a record stored as a line in a HyperCard text field is limited to the width of the screen. Memory size of an Excel file holding the same amount of information as a corresponding HyperCard Stack is much smaller.

Holdings lists can also be stored in a scrolling field in HyperCard, such as the notes field in the Maps stack. The small size of the scrolling box in this field allows you to view three lines at a time only (although the content of a field can be up to 32 K). Another much larger scrolling field can be created for the holdings information. This field is normally hidden and will be displayed at the click of a button. Before this field is displayed, it it necessary first to hide the background graphics and some of the background fields to give as much space on the screen to this field as possible.

The card or background fields can be used as if they are two-dimensional arrays or tables. What follows is an example.

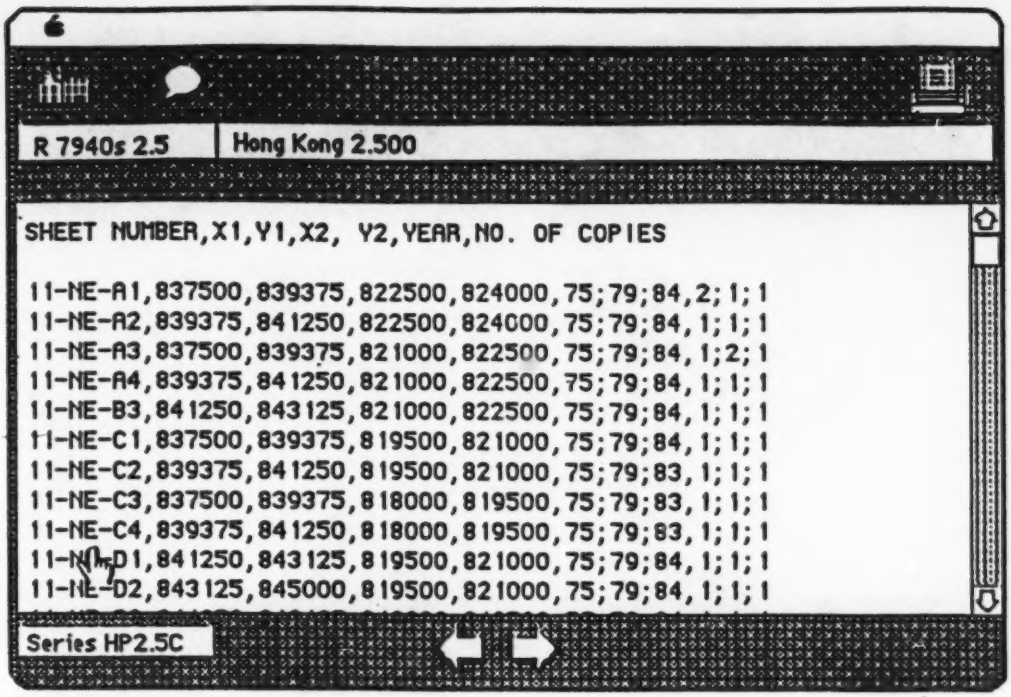


Fig. 5. Holdings list stored in a HyperCard field

The first line contains some labels that describe the contents of each field in the table. One line constitutes one record. Items in each line are separated by commas. Individual items in different lines can be addressed. Excel files can be imported into HyperCard text fields.

If one line in a HyperCard field is not sufficient for holding all the information for one record, then it may be necessary to create one stack for one map series and then link this stack to the main cartobibliographic entry in the Maps stack by mean of a button. This approach is very similar to multi-level cataloguing described in ISBD (CM). It permits multiple document control at multiple levels as in the case of map analytics from atlases or in the control of map sets or series at both the sheet and set level. The call number, series number, series title and authorship which do not change from sheet to sheet can be entered in the background. Fields are allocated to the items that change from sheet to sheet. This makes efficient update of the map series possible.

CONCLUSION

Our feasibility study with HyperCard has enabled us to organize information in much the same way we would do in our mind - by association and context. It has enabled us to explore information in a multimedia environment, integrating graphics with text and numerals. It has also helped reduce redundancy, such as in multi-level map cataloguing. HyperCard lacks some features such as the ability to produce sophisticated reports, but boasts a high-speed and flexible Find Command that makes search within fields possible.

HyperCard is not designed for generating reports, but is optimized for quickly looking through existing cards. It is quite accommodating if you do not remember details. Even if you have only a slight recollection of the information, HyperCard will let you quickly browse through the stack to find exactly what your are looking for. Naturally, the more specific you can be in year search request, the quicker HyperCard will reach the desired card. It is easy to use and easy to understand the information presented.

The potential for expansion is high. Image-retrieval systems such as CD-ROM and video discs combined with image-presentation tools will greatly enhance the power of HyperCard. At present laser read-only compact discs are used to distribute conveniently huge geographic databases to many users HyperCard can fit into the world of database as a flexible graphic front end to other DBMS packages, even those residing on other computers (ORACLE).(Shafer)

The Macintosh environment represents the best balance between ease of use and configuration in the current generation of personal computers. Its graphics software is more versatile and better integrated (you can use most of the same commands from one programme to the next and file formats are more standardized, so more programmes can read them) than that for other PC platforms. Friendly user interface and consistency in software development means tremendous saving in staff training. HyperCard and other graphic applications which we use are run by "point and click" menu choices or icons of shapes, fill patterns and colours. It takes a novice little time to learn the essential commands for editing scanned images to create index maps and other graphics.

References

Goodman, Danny. The complete HyperCard handbook. New York, Bantam Books, 1987

ISBD(CM): International standard bibliographic description for cartographic materials. Rev. ed. London, IFLA Bibliographic Control and International MARC Programme, British Library Bibliographic Services, 1987.

Shafer, Dan. HyperTalk programming. Indianapolis, Hayden Books, 1988.

Shafer, Dan. Using ORACLE's Hyper*SQL. *HyperLink*. Jan./Feb. 1989. pp.11-14.

Shafer, Dan. What ORACLE foretells for the Macintosh. *HyperLink*. Nov./Dec., 1988. pp. 11-13

Wood, Roger. HyperCard and CD ROM. *HyperLink*. Jan./Feb. 1989. pp.52-54.